Indian Archaeology

1978-79 A REVIEW



Cover: murals from Alchi, Ladakh

August, 1981
ARCHAEOLOGICAL SURVEY OF INDIA
GOVERNMENT OF INDIA

Price : *Rs. 80.00*

PRINTED AT NABA MUDRAN PRIVATE LTD., CALCUTTA 700 004

PREFACE

With the publication of this issue of the *Review,* the backlog of the arrears has almost been cleared and we look forward with renewed hope and complacency to the timely publication of the future issues: The issue for the current year, viz. 1979-80 is under compilation and should be out before the next one falls due.

It will be noticed that in this issue, the material under Explorations and Excavations has been presented in a different manner than that of the earlier issues, for which we owe an explanation to the readers. It may be recalled that during the last Five Year Plan period it was decided to re-orient and rouse to action the praiseworthy Scheme relating to the Survey of Antiquarian Remains which aimed at preparing a full gazetteer of antiquities in the country. While active participation and full involvement of the universities in this Scheme was considered necessary it was found equally important that besides village-to-village survey, fruitful results could be obtained by undertaking problem-oriented surveys in certain selected areas. In the like manner, for excavations some national projects were identified with a view to filling the gaps in our existing knowledge of various cultural periods, extending from the palaeolithic to the medieval. Consistent with the requirements, fieldwork was organized accordingly and the results obtained therefrom have been presented in a logical and easily accessible order, describing first the explorations and then the excavations. We do hope that the present arrangement would be found more useful to the scholars.

As usual, I am grateful to all the contributors both from the Survey as also from the various State Governments, universities and other research institutions for sending their material without which the usefulness of the *Review* to Indian archaeology would not have been possible. Concluding on a personal note I may add that this is the last issue edited by me and I take this opportunity of thanking my colleagues in the Survey, particularly those in the Publications Branch, for the cooperation and tolerance shown to me in my functions as the editor.

New Delhi
31 December, 1980

B. K. THAPAR

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INDIAN ARCHAEOLOGY 1978-79

—A REVIEW

I. EXPLORATIONS AND EXCAVATIONS

1. EXPLORATIONS

A. VILLAGE TO VILLAGE SURVEYS OF ANTIQUARIAN REMAINS AND OTHER EXPLORATIONS[1]

Andhra Pradesh

1. EXPLORATION IN DISTRICT KRISHNA.—In the course of his exploration, Shri C. L. N. Sastry of the South-eastern Circle of the Archaeological Survey of India,[2] discovered the following sites.

District	*Taluk*	*Village/Site*	*Cultural assemblage*
Krishna	Bandar	Akulamannadu	Early historical and Medieval
-do-	-do-	Balliparru	Early historical and Medieval
-do-	-do-	Chittiguduru	Early historical and Sculptures
-do-	-do-	Chodavaram	Early historical and Medieval
-do-	-do-	Gudur	Medieval temples, Inscriptions and Sculptures
-do-	-do-	Jinjeru	Early historical and Medieval
-do-	-do-	Kankata	Early historical, Medieval and Sculptures
-do-	-do-	Konkepudi	Medieval temples and Sculptures
-do-	-do-	Kuduru	Medieval
-do-	-do-	Madaka	Early historical and Medieval
-do-	-do-	Mukkollu	Early historical and Sculptures
-do-	-do-	Nadupur	Sculptures
-do-	-do-	Nandampur	Medieval
-do-	-do-	Polavaram	Sculptures
-do-	-do-	Ramanujavarahapalle	Sculptures
-do-	-do-	Serivarthalahopalle	Medieval
-do-	-do-	Tarakatur	Early historical
-do-	-do-	Vadlamannadu	Early historical and Sculptures

[1] Items 1-3, 5, 7, 11-12, 14-17, 21-22, 25-29 and 31-34 relate to explorations under the Village-to-Village Survey of Antiquarian Remains Scheme while the remaining ones relate to other explorations under individual programmes.

[2] The Archaeological Survey of India is referred to in the following pages as the 'Survey'.

District	*Taluk*	*Village/Site*	*Cultural assemblage*
Krishna	Nandigama	Aitavaram	Early historical and Medieval
-do-	-do-	Amburupeta	Medieval and Sculptures
-do-	-do-	Amarevaram	Early historical and Medieval
-do-	-do-	Atukuru	Neolithic
-do-	-do-	Bandipalem	Early historical and Medieval
-do-	-do-	Bathenapadu	Early historical and Medieval
-do-	-do-	Bellamkondapalem	Early historical
-do-	-do-	Bodavada	Early historical and Medieval
-do-	-do-	Chennaraopalem	Early historical and Medieval
-do-	-do-	Chevitikallu	Early historical and Medieval
-do-	-do-	Dachavaram	Early historical, Medieval and Coins
-do-	-do-	Eturu	Early historical, Medieval and Sculptures
-do-	-do-	Gandepalle	Early historical, Medieval and Sculptures
-do-	-do-	Gottukukkala	Early historical and Coins
-do-	-do-	Jagannadhapuram	Medieval
-do-	-do-	Jammavaram	Medieval
-do-	-do-	Jujjuru	Early historical and Medieval, Medieval temples, Sculptures and Inscriptions
-do-	-do-	Kasarabada	Medieval
-do-	-do-	Kesara	Early historical, Medieval and Sculptures
-do-	-do-	Kethaveerunipadu	Early historical and Medieval
-do-	-do-	Kodavatikallu	Neolithic and Early historical
-do-	-do-	Konakanchi	Early historical and Inscriptions
-do-	-do-	Konathalapalle	Medieval
-do-	-do-	Kunikanapadu	Neolithic, Early historical and Medieval
-do-	-do-	Moguluru	Early historical and Medieval
-do-	-do-	Nawabpeta	Early historical, Medieval temples and Inscriptions
-do-	-do-	Pallempalle	Early historical and Medieval
-do-	-do-	Paritala	Medieval
-do-	-do-	Patempadu	Medieval
-do-	-do-	Pokkunuru	Early historical, Medieval Inscriptions and Sculptures
-do-	-do-	Rangapuram	Medieval
-do-	-do-	Sanagapadu	Neolithic, Early historical and Medieval
-do-	-do-	Thadigummi	Early historical and Medieval
-do-	-do-	Thotacherla	Early historical and Medieval
-do-	-do	Thotaravulapadu	Inscriptions
-do-	-do-	Timmapuram	Sculptures and Inscriptions
-do-	-do-	Vellanki	Early historical, Medieval and Coins
-do-	-do-	Vemulapalle	Medieval
-do-	-do-	Verakampadu	Sculptures
-do-	-do-	Yenganayakunipalem	Early historical and Medieval
-do-	Vijayawada	Chilukur	Early historical
-do-	-do-	Damuluru	Early historical and Medieval
-do-	-do-	Duggirallapadu	Early historical and Medieval
-do-	-do-	Madhavavaram	Medieval and Sculptures

2. EXPLORATION IN DISTRICT MAHBUBNAGAR.—In the course of his exploration, Shri P. Sitarama Murthy of the South-eastern Circle of the Survey discovered the following sites.

District	*Taluk*	*Village/Site*	*Cultural assemblage*
Mahbubnagar	Alampur	Aburdidpad	Early historical
-do-	-do-	Amarawai	Medieval and Sculptures
-do-	-do-	Bhairapur	Late Medieval temples
-do-	-do-	Bhecmavaram	Early historical, Sculptures and Inscriptions
-do-	-do-	Boravelli	Medieval and temples
-do-	-do-	Chagapur	Early Medieval and Medieval temples
-do-	-do-	Chennipad	Late Medieval temples and Inscriptions
-do-	-do-	Dharmawaram	Early historical and Megaliths
-do-	-do-	Imampur	Medieval
-do-	-do-	Jallapur	Early historical and Medieval
-do-	-do-	Kalakuntla	Medieval and Sculptures
-do-	-do-	Konair	Medieval and temples
-do-	-do-	Korvipad	Medieval temples and fort
-do-	-do-	Linganwai	Medieval and temples
-do-	-do-	Maddur	Megaliths, Medieval and temples
-do-	-do-	Manopad	Early Medieval temples
-do-	-do-	Pallepad	Medieval temples
-do-	-do-	Possalpad	Early historical
-do-	-do-	Rajoli	Early historical
-do-	-do-	Rampur	Early Medieval temples
-do-	-do-	Sasnool	Early historical
-do-	-do-	Timmapur	Medieval and Sculptures
-do-	-do-	Uddandapur	Medieval
-do-	-do-	Undavelli	Medieval and temples
-do-	-do-	Vallur	Medieval
-do-	-do-	Vemula	Early historical and Medieval

3. EXPLORATION IN DISTRICT PRAKASAM.—In the course of his exploration, Shri R. V. Siva Sarma of the South-eastern Circle of the Survey discovered the following sites.

District	*Taluk*	*Village/Site*	*Cultural assemblage*
Prakasam	Addanki	Addanki	Early historical, Medieval temples and Inscriptions
-do-	-do-	Bhimavaram	Medieval temples
-do-	-do-	Bobbepalle	Neolithic, Early historical and Medieval temples
-do-	-do-	Bollapalle	Early historical and Medieval temples
-do-	-do-	Budavada	Medieval temples

District	*Taluk*	*Village/Site*	*Cultural assemblage*
Prakasam	Addanki	Chandalur	Medieval temples and Inscriptions
-do-	-do-	Darsiagraharam	Early historical
-do-	-do-	Doddukur	Early historical
-do-	-do-	Dronadula	Neolithic, Early, historical and Medieval temples
-do-	-do-	Eddanapudi	Medieval temples
-do-	-do-	Govada	Early historical
-do-	-do-	Gurizepalle	Early historical and Megaliths
-do-	-do-	Kolalapudi	Medieval temples and Inscriptions
-do-	-do-	Koniki	Early historical
-do-	-do-	Kopparam	Medieval temples and Inscriptions
-do-	-do-	Paidipadu	Early historical, Medieval temples and Inscriptions
-do-	-do-	Pangulur	Early historical and Medieval temples
-do-	-do-	Santhamagulur (old)	Early historical and Medieval temples
-do-	-do-	Uppumagulur	Early historical and Medieval temples
-do-	Darsi	Annavaram	Early historical
-do-	-do-	Avnlamanda	Medieval temples
-do-	-do-	Chandaluru	Medieval temples
-do-	-do-	Chandavaram	Early historical
-do-	-do-	Dekanakonda	Late Medieval temples
-do-	-do-	Devavaram	Late Medieval temples
-do-	-do-	Ganeswarampuram	Late Medieval temples
-do-	-do-	Gangawaram	Late Medieval temples
-do-	-do-	Kalluru	Early historical and Medieval temples
-do-	-do-	Kurichedu	Early historical, Medieval temples and Inscriptions
-do-	-do-	Naidupalem	Megaliths
-do-	-do-	Nancharapuram	Early historical
-do-	-do-	Polepalle	Early historical
-do-	-do-	Pulipadu	Early historical
-do-	-do-	Rajampalle	Early historical
-do-	Ongole	Ramathirtham	Early historical, Medieval temples, Inscriptions and Megaliths

Gujarat

4. EXPLORATION IN DISTRICTS AHMADABAD, BHARUGH, JUNAGADH, KHEDA, MAHESANA, RAJKOT, SABAR KANTHA AND SURAT.—In the course of exploration, the Department of Archaeology, Government of Gujarat, discovered the following sites.

District	*Taluk*	*Village/Site*	*Cultural assemblage*
Ahmadabad	Dhankhuka	Hadmatala	Harappan
Bharuch	Jaghadia	Naivgam	Medieval
Junagadh	Malia-Hatina	Vadala	Early Historical
-do-	Vanthali	Gadoi	Temple and step-well (Solanki period)

District	*Taluk*	*Village/Site*	*Cultural assemblage*
Kheda	Petlad	Shihol	Medieval
Mahesana	Sami	Babri	Medieval
-do-	-do-	Gochnad	Early historical and Medieval
-do-	-do-	Juna-Rampura	Medieval
-do-	-do-	Kharcharia	Medieval
Rajkot	Dhoraji	Dhoraji	Protohistoric
-do-	Jam-Kandorana	Rayadi	Protohistoric
-do-	Jasdan	Ambaradi	Protohistoric and Medieval
-do-	-do-	Rupavati	Early historical and Medieval
-do-	Padadhari	Padadhari	Protohistoric
-do-	-do-	Vachali Ghodi	Protohistoric
Sabar Kantha	Himatnagar	Rupal	Siva temples (fourteenth century A.D.)
-do-	Pratij	Harsol	Microliths, Early historical and Medieval
-do-	Vijayanagar	Pal	step-well (Solanki period)
Surat	Ghoryasi	Surat	Fort (A.D. 1540-41)
-do-	Mangroli	Vasaravi	Medieval
-do-	Nizar	Hingani-Digar	Fort (Maratha period)

5. EXPLORATION IN DISTRICTS AMRELI AND KUTGH.—In the course of exploration, the Department of Archaeology, Government of Gujarat, discovered the following sites.

District	*Taluk*	*Village/Site*	*Cultural assemblage*
Amreli	Amreli	Bhandria-Motha	Early historical
-do-	-do-	Kathma	Early historical
-do-	-do-	Kerala	Early historical
-do-	-do-	Kera Nagas	Late historical
-do-	-do-	Machiyala-Mota	Early historical
-do-	-do-	Pipllage	Protohistoric
-do-	-do-	Pithavajal	Late historical
-do-	-do-	Vadera	Harappan
-do-	Kunkavawadia	Anida	Early historical
-do-	-do-	Bhukhli-Santhali	Early historical
-do-	-do-	Deri Pipalia	Early historical
-do-	-do-	Hadala	Early historical
-do-	-do-	Kunkavav-Nani	Early historical
-do-	-do-	Morvada	Early historical
-do-	-do-	Nagapur	Early historical
-do-	-do-	Rampur	Early historical
-do	-do-	Sanali	Early historical
-do-	-do-	Ujala-Mota	Early historical
-do-	-do-	Ujala-Nava	Early historical
-do-	-do-	Vaghania-Juna	Protohistoric and Early historical
-do-	-do-	Vaghania-Nava	Early historical
-do-	Abdasa	Bandhia to Sukhpar	Middle Palaeolithic tools
-do-	Anjar	Bhuvad	Microliths
-do-	-do-	Ratnal	Microliths

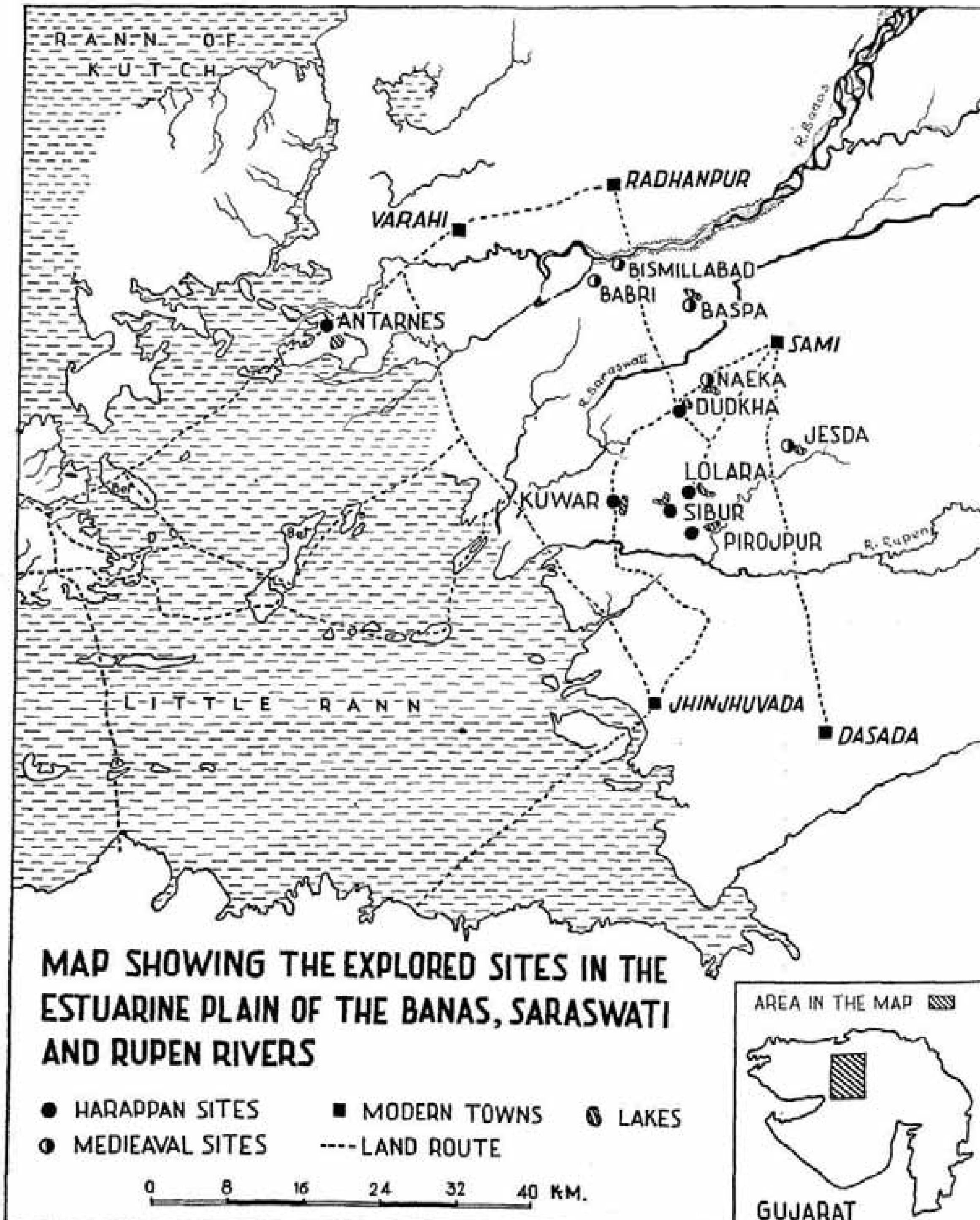

RANN OF KUTCH
R. Banas
RADHANPUR
VARAHI
BISMILLABAD
BABRI
BASPA
ANTARNES
SAMI
R. Saraswati
NAEKA
DUDKHA
JESDA
LOLARA
KUWAR
SIBUR
PIROJPUR
R. Rupen
LITTLE RANN
JHINJHUVADA
DASADA
MAP SHOWING THE EXPLORED SITES IN THE ESTUARINE PLAIN OF THE BANAS, SARASWATI AND RUPEN RIVERS
HARAPPAN SITES
MODERN TOWNS
LAKES
MEDIEAVAL SITES
----LAND ROUTE
0 8 16 24 32 40 KM.
AREA IN THE MAP
GUJARAT

FIG. 1.

6. EXPLORATION IN DISTRICTS BANAS KANTHA, MAHESANA AND SURENDRANAGAR.—A team, consisting of Dr C. Margabandhu and Shri K. Raghavachary of the Western Circle of the Survey and Professors A. M. Thakkar and K. T. M. Hegde of the M. S. University of Baroda, conducted exploration in the region as the western parts of the Districts form a fertile, estuarine plain, built of coalescing alluvial silt and clay brought down by the rivers Banas, Saraswati and Rupen that flow into the little Rann of Kutch (fig. 1), and is dotted with a series of stable, relict sand dunes that contain lakes at their base, being a favourable ecological factor, for the mesolithic and the chalcolithic communities to settle. Five land routes passing through Bets in the Rann connect the plain with Kutch and Saurashtra. There is enough evidence of Harappan communities migrating into Kutch and Saurashtra, who chose elevated grounds and rocky outcrops to settle. The team discovered the following sites.

District	*Taluk*	*Village/Site*	*Cultural assemblage*
Banas Kantha	Radhanpur	Babri	Medieval
-do-	-do-	Baspa	Medieval
-do-	-do-	Bismillabed	Medieval
-do-	-do-	Naeka	Medieval
-do-	Varahi	Antarnes	Harappan
Mahesana	Sami	Dudkha	Harappan
-do-	-do-	Jesda	Medieval
-do-	-do-	Kuwar	Harappan
-do-	-do-	Lorala	Harappan
-do-	-do-	Pirojpur	Harappan
-do-	-do-	Shibpur	Harappan

7. EXPLORATION IN DISTRICT JAMNAGAR.—In the course of his exploration, Shri Kuldeep Bhan of the Department of Archaeology and Ancient History, M. S. University of Baroda, discovered the following sites.

District	*Village/Site*	*Cultural assemblage*
Jamnagar	Ambliala	Harappan
-do-	Bhavnagar/Triveni	Microliths
-do-	Bodki	Medieval
-do-	Fathepur	Early historical (in two localities)
-do-	Ghumli	Medieval sculptures
-do-	Ghumli/Sonkansari	Medieval sculptures
-do-	Kabarka	Medieval
-do-	Kalawar	Medieval (in two localities)
-do-	Krushnagadh	Microliths
-do-	Mewasa	Early historical and Medieval
-do-	Morpur	Microliths (in three localities)
-do-	Rupamore	Microliths
-do-	Sai-Devlia/Sanara-Timbo	Harappan and Early historical
-do-	Verar/Hanuman-na-Timbo	Early historical
-do-	Verar/Mama-Puna-na-Rimbo	Medieval
-do-	Vijaypura/Pindara-Nazd	Lower Palaeolithic

Haryana

8. EXPLORATION IN DISTRICTS AMBALA, BHIWANI, GURGAON, JIND, KURUKSHETRA, MAHINDERGARH, ROHTAK AND SONIPAT.—In the course of exploration conducted by the Department of Archaeology, Government of Haryana, the following sites were noticed.

District	*Village/Site*	*Cultural assemblage*
Ambala	Adi-Bedri	Late medieval temple, sculpture, inscription and architectural members
-do--do-	Bhukheri	Painted Grey Ware
-do--do-	Kala Amb	River terrace yielding Stone Age tools
-do--do-	Kalka	River terrace yielding Stone Age tools
-do-	Mehranwala	Late Harappan
Bhiwani	Pinjore	Early medieval temple
	Raipur Rani	Late medieval pottery and sculpture
-do--d	Rathpure (Pinjore)	Early medieval temple
o-	Kanwari	Early historical and late medieval, temple and sculptures of ninth-tenth century A.D.
	Naurangabad	Terracottas, coins, pottery and sculptures (Sunga, Kushana and Yaudheya times)
	Atta	Early historical and Late medieval, temple and sculptures of ninth-tenth century A.D.
Gurgaon		Grey ware of early historical times, Jaina and Saivite sculptures of eighth-ninth century A.D.
Jind	Ballu	
-do-	Budha-Khera	Pre-Harappan and degenerate Harappan
-do-	Hat	Painted Grey Ware
-do-	Jind I	Painted Grey Ware, Kushana and Late historical
-do-	Jind II	Late Harappan and Painted Grey Ware
-do-	Kirsola	Harappan and Painted Grey Ware
-do-	Varaha	Late Harappan and Painted Grey Ware
Kurukshetra	Arunnaya I	Painted Grey Ware, Northern Black Polished Ware and associated wares and Kushana pottery
-do-	Arunnaya II	Early historical and medieval
	(Uchha-Pind)	Painted Grey Ware
-do-	Arunnaya III	
	(Shiva-Mandir-ki-Theri)	Early medieval temple
-do-	Bohre Syeda	
-do-	Kaithal	Early historical, medieval pottery and early medieval temple
-do-	Manas	Painted Grey Ware
Mahinderagarh	Kultajpure	Late medieval pottery
	(Doshi-hill)	Stone Age tools and medieval temple

District	*Village/Site*	*Cultural assemblage*
Rohtak	Baliana	Pre-Harappan, Harappan, degenerate Harappan and Painted Grey Ware
-do-	Balour	Historical and Late medieval
-do-	Beri	Kushana, Gupta, Late historical and eight sculptures of tenth-eleventh century A.D.
-do-	Bohre-Asthal	Medieval
-do-	Gandhra	Painted Grey Ware and black-slipped ware
-do-	Gijjhi	Painted Grey Ware
-do-	Ismaila I	Painted Grey Ware, Northern Black Polished Ware, Kushana and Late historical
-do-	Majra Asthal	Kushana and Late historical
-do-	Meham	Glazed ware
-do-	Mohan-Bari	Kushana and remains of a large temple
-do-	Rithal	Painted Grey Ware, Kushana and Late historical and sculpture *of yakshi*
-do-	Rookhi I	Kushana and Rang Mahal
-do-	Rookhi II	Pre-Harappan, degenerate Harappan and Painted Grey Ware
-do--	SanghiI	Painted Grey Ware
-do-	Sanghi II	Late Harappan and historical
Sonipat -	Shalahawas	Medieval
- do-	Bindroli	Kushana and Late historical
-do-	Gurjar Kheri	Historical, late historical and medieval temple and sculptures
-do-	Mohandabad	Medieval
	Purkhas	Late medieval pottery and sculptures

Karnataka

9. EXPLORATION IN DISTRICTS BANGALORE, BIDAR, DHARWAR AND HASSAN.—In the course of exploration, the Department of Archaeology and Museums, Government of Karnataka, discovered a dilapidated Siva temple belonging to Chola period at Doddahullur in Hoskote Taluk of District Bangalore. The *garbhagriha* and *antarala* of the temple are in a fairly good state of preservation, while the parapet and superstructure are missing. The outer walls are decorated with figures of Bedara Kannappa, Venu-gopala and Kiratarjuniya. A Tamil inscription of the Hoysala period, recording the renovation of the temple from *upana* to *stupi,* is on the *tripatta-kumuda* moulding of *adhishthana.*

Besides, the party also explored the following: a neolithic habitation site at Islampur, a Siva temple with an inscription dated to A.D. 1228, on one of the pillars, and housing sculptures of Siva, Parvati, Vishnu, Lakshmi and Ganesa, at Jadlegaon, megalithic sites at Hulsur and Nivgudi, all in Basavakalyan Taluk of District Bidar and temples dedicated to Lakshmi and Somalingesvara at Khed in Aurad Taluk of District Bidar.

At Medur in Hirekerur Taluk of District Dharwar were noticed a Panchalingesvara temple having five *lingas* in five different shrines, beautiful sculptures of Vishnu, Surya, Bhairava, Ganesa, Mahishasuramardini, *saptamatrikas* and four inscriptions, all belonging to the Kalyana Chalukya period.

Three temples, of which the Kunjesvara temple, built in A.D. 1255, consisting of two *garbhagrihas, navaranga* and *mukhamandapa* and a small shrine by the side of it and Siddhesvara temple of *tri-kuta* type with three *garbhagrihas* and a *navaranga,* and three inscriptions, all belonging to Hoysala period, were noticed at Hiruyur, a prosperous town in the Hoysala period and known as Muttana-Hosavuru in Arsikere Taluk of District Hassan.

10. EXPLORATION IN DISTRICT RAICHUR.—In the course of their exploration, Drs B. S. Kulkarni and A. Sundara of the Kannada Research Institute, Karnatak University, Dharwar, noticed rock-paintings at Anegondi (Gangavati Taluk) and Bail Marched (Manvi Taluk), the former depicting impressive bulls and geometrical designs in red ochre and probably belonging to the last phase of the chalcolithic period and the latter showing horse riders in red ochre, probably belonging to medieval period. Besides, a chalcolithic site was also noticed at Indurgi in Gangavati Taluk.

Further, they noticed remains of temples and sculptures belonging to the late Chalukyan period, at Sivapura (Gangavati Taluk), Salgunda (Sindhnur Taluk), Bail Marched and Maski. Besides, temples and sculptures belonging to Vijayanagara times were noticed at Agalakere (Koppal Taluk), Gorebal (Sindhanur Taluk) and Salgunda. Among a few inscriptions noticed, the one at Salgunda, engraved on a huge boulder and palaeographically datable to *circa* eighth century A.D., and probably recording proper names of some persons, is noteworthy.

Dr Sundara discovered: (i) an ancient site, yielding neolithic, early historical and late medieval cultural remains at Badarli and Kunnatgi (both in Sindhanur Taluk); (ii) remnants of an ash-mound at Ka vital (Lingsugur Taluk), yielding early historical; (iii) historical vestiges at Sirwar; and (iv) late medieval sites at Kavital and Kurkunda (Deodurga Taluk). Besides, he discovered: temples belonging to the middle Rashtrakuta period at Sirwar; temples of eleventh-twelfth century in late Chalukyan style at Budihal, Devaragudi, Harapura, Madi Sirwar Kannari, Uppal, all in Sidhnur Taluk, Kurukunda, in Deodurg Taluk, Sirwar in Raichur Taluk and Malatta in Lingsugur Taluk. Of these, the plan of the Mallikarjuna temple at Malatta is peculiarly asymetrical. Among the noteworthy sculptures may be mentioned the following: Ganesa at Uppal in late Chalukyan style with ornamentation of early times; and Ganesa at Madi Sirwar, datable to tenth-eleventh century A.D.

Kerala

11. EXPLORATION IN DISTRICT PALGHAT.—During the course of his exploration, Shri M. Raman Namboodiri of the Southern Circle of the Survey noticed megalithic multi-chambered cists at Vadakarapatti and dolmens at Elevanchery, Kongad, Manjaloor and Pallassana. Besides, a few urn-burials were also noticed at Manjaloor.

Madhya Pradesh

12. EXPLORATION IN DISTRICT BHIND.—In the course of his exploration, Shri Krishnapal Singh Bhadoria of the Central Circle of the Survey, discovered the following sites.

District	*Taluk*	*VillagejSite*	*Cultural assemblage*
Bhind	Bhind	Aheti	Historical pottery
-do-	-do-	Aithar	Late Medieval sculpture of a Jaina *trithankara* and *sati-pillar*
-do-	-do-	Baderi	Medieval sculptures and architectural fragments
-do-	-do-	Barhi	Late Medieval fragmentary Jaina sculptures
-do-	-do-	Bhadakhur	Medieval Brahmanical Sculptures
-do-	-do-	Bijora	Medieval fragmentary Brahmanical sculptures and .stfft'-pillar
-do-	-do-	Boreshwar	Remains of a Pratihara temple
-do-	-do-	Dighi	Historical pottery
-do-	-do-	Jabai	Medieval fragmentary Brahmanical sculptures
-do-	-do-	Jari	Late Medieval ^/-pillar
-do-	-do-	Kachongra	Medieval Brahmanical sculptures
-do-	-do-	Kanawar	Medieval Brahmanical sculptures and architectural fragments
-do-	-do-	Koshand	Medieval Brahmanical and Jaina sculptures
-do-	-do-	Misa	Painted Grey Ware sherds, Early historical pottery and Gupta terracotta plaques
-do-	-do-	Pachokhra	Medieval Brahmanical sculptures
-do-	-do-	Paraya	Medieval fragmentary Brahmanical sculptures
-do-	-do-	Parsona	Medieval fragmentary Brahmanical sculptures
-do-	-do-	Phup Kalan	Medieval fragmentary Brahmanical sculptures
-do-	-do-	Pur	Medieval fragmentary Brahmanical sculptures
-do-	-do-	Ramakot	Medieval glazed pottery and late medieval sculpture of Jaina *tirthankara*
-do-	-do-	Sakraya	Medieval fragmentary Brahmanical sculptures
-do-	-do-	Sapar	Late Medieval wft-pillar
-do-	-do-	Sonhra	Medieval fragmentary Brahmanical sculptures

13. EXPLORATION IN DISTRICT RAIGARH.—In the course of his exploration, Shri P. B. S. Sengar under the guidence of Dr K. D. Banerjee, of the Prehistory Branch of the Survey discovered sites yielding microliths (pi. I A) at Bailtoli (Fatehpur), Bartoli, Bhamtil, Dund-kachaora, Gamaria, Jirgum, Jaria, Karamtoli and Tukutoli.

The area (Jashpurnagar Taluk) where these sites are situated is generally covered with a mantle of detrital reconsolidated Jaterite superimposing the Archaean bed-rock. The microliths are found at the junction of detrital laterite and recent alluvium. The implements are mainly

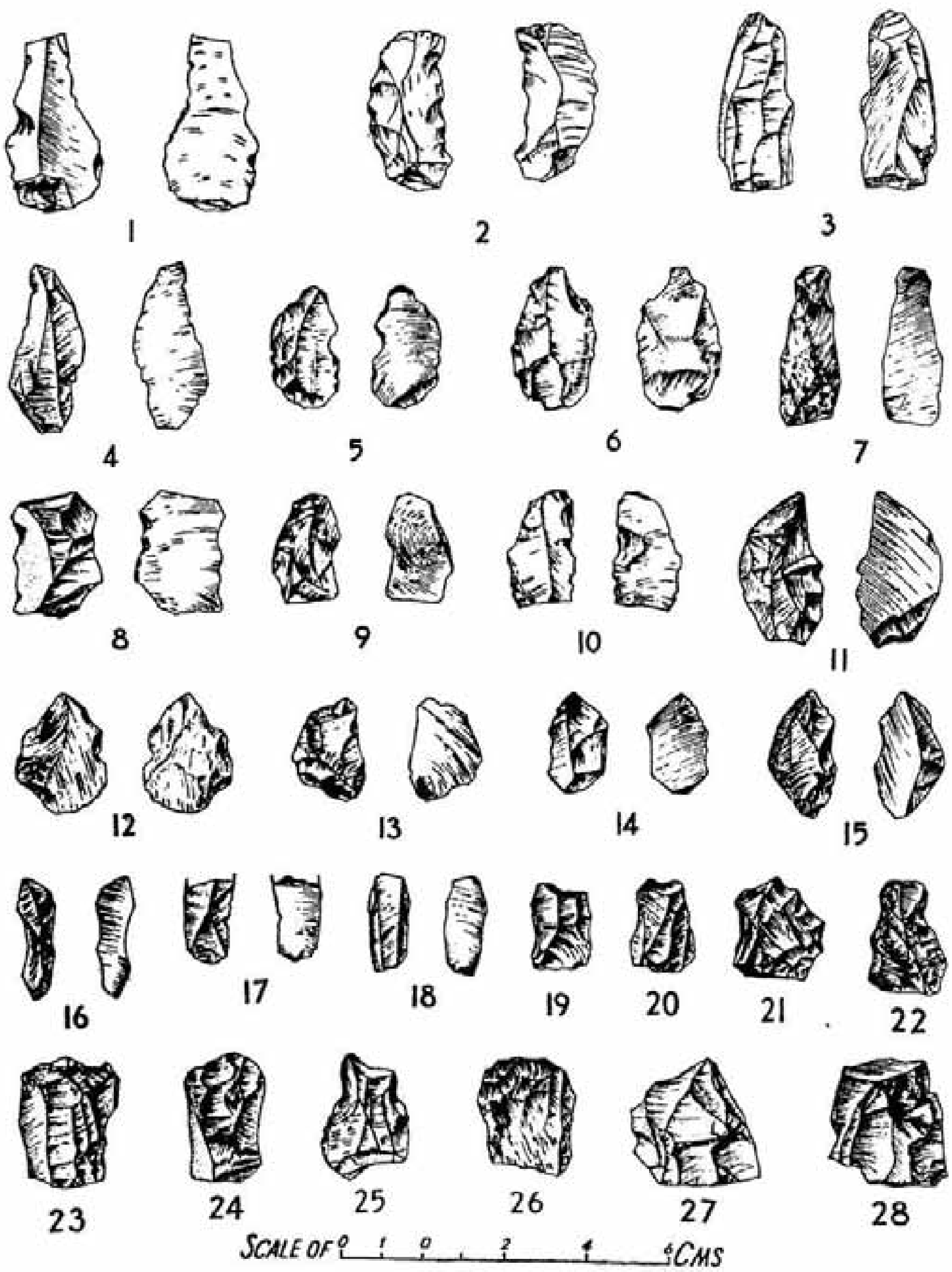


FIG. 2. *Raigarh : microliths*

prepared on quartz and chert. The manufacturing technique appears to be rather crude. A large number of microliths (fig. 2) comprising scrapers, points, borers, blades, cores and waste flakes were collected. The proportion of blades in these assemblages is much less while that of points is comparatively very high. No pottery was found in association with these assemblages.

14. EXPLORATION IN DISTRICT RAISEN.—During the course of his exploration, Shri Narayan Vyas of the Central Circle of the Survey, brought to light the following sites.

District	*Taluk*	*Village/Site*	*Cultural assemblage*
Raisen	Bareli	Bamhori Wazirganj	Microliths
-do-	-do-	Bari	Microliths, historical pottery, sculptures, fort, palace and *sati-pillar*
-do-	-do-	Barikhurd	Medieval sculptures and *sati-pillar*
-do-	-do-	Chaukigarh	Microliths, medieval sculptures, fort, palaces, tank, *baoli* and residential structures (of Gond rulers)
-do-	Raisen	Agaria Chopra	Lower Palaeolithic tools
-do-	-do-	Ambari	Painted rock-shelters, Paramara sculptures and *sati*-pillar.
-do-	-do-	Anori	Paramara sculptures and inscription
-do-	-do-	Balarkho	Medieval sculptures
-do-	-do-	Balori	Medieval Brahmanical sculptures and *sati*-pillar
-do-	-do-	Bankheri	Historical pottery
-do-	-do-	Berkheritunda	Historical pottery and medieval sculptures
-do-	-	Besar	Fragment of Mauryan polished stone inscription in Brahmi characters of first-second century B.C., pillar-capitals of bull and elephant (first-second century B.C.), cross-bars of *stupa*-railings, tank, residential buildings and stone structures
-do-	-do-	Bhagwanpura Colony	Pillar and pillar capitals, railing pillars, Early and Late medieval Brahmanical sculpture, *yakasha* sculpture, stone structures and wells
-do-	-do-	Bhanwarkheri	Medieval Brahmanical sculptures and wells
-do-	-do-	Bhartipur	Medieval Brahmanical sculptures, tank, stone structure and *sati*-pillar
-do-	-do-	Bhoipura Colony	Lower Palaeolithic tools
Raisen	Raisen	Bhojpur	Lower Palaeolithic tools
-do-	-do-	Binjoli Khera	Medieval Brahmanical sculptures, inscription, stone structure and wells
-do-	-do-	Biskhera	Historical pottery, Medieval Brahmanical sculptures and *sati*-pillar
-do-	-do-	Chapna	Lower Palaeolithic tools
-do-	-do-	Chapra	Lower Palaeolithic tools
-do-		Chirholi	Medieval sculptures

District	Taluk	Village/Site	Cultural assemblage
Raisen	Raisen	Dargawn	Medieval Brahmanical sculptures, tank, wells and stone structures
-do-	-do-	Dhakna	Bull-capital (second-first century B.C.) and Medieval Brahmanical sculptures
-do-	-do-	Diwanganj	Microliths, rock-shelters and medieval Brahmanical sculptures
-do-	-do-	Eran	Historical and Medieval sculptures and stone structures
-do-	-do-	Firozpur	Early historical and Medieval sculptures
-do-	-do-	Fatehpur-marmata	Early historical pottery, Medieval Brahmanical sculptures and *sati*-pillar
-do-	-do-	Gadarkheri	Palace of the Nawwab of Bhopal (ninteenth century)
-do-	-do-	Ghatpipalia	Microliths, rock-paintings, inscription in shell characters, Medieval sculptures and *sati*-pillar
-do-	-do-	Gopisar	Lower Palaeolithic tools
-do-	-do-	Gulgaon	Sunga, Gupta and medieval sculptures, old mosque and *sati*-pillar
-do-	-do-	Hirankhera	Rock-paintings
-do-	-do-	Kachnarya	Medieval sculptures and *sati*-pillar
-do-	-do-	Kampur	Lower Palaeolithic tools
-do-	-do-	Kanakhera Kalan	Lower Palaeolithic tools, microliths and rock-paintings
-do-	-do-	Khabai	Microliths, rock-paintings and medieval sculptures
-do-	-do-	Khamkhera	Stone structures, baoli and *sati*-pillar of medieval period
-do-	-do-	Kharetia	Microliths, medieval sculptures, well and *sati*-pillar
-do-	-do-	Khemkheri	Medieval sculptures and residential structures
-do-	-do-	Kulharia	Rock-paintings, mound, pottery, medieval sculptures
-do-	-do-	Lamabakhera	Lower Palaeolithic tools
-do-	-do-	Manchi	Microliths, rock-paintings, medieval Buddhist votive stupa
-do-	-do-	Mandha	Sunga and Medieval sculptures, well and *sati*-pillar
-do-	-do-	Mandwai	Medieval sculptures
-do-	-do-	Mehgaon	Sculpture of Balarama (Sunga period), tank, medieval pillar in a tank and sculptures and *sati*-pillar
-do-	-do-	Mendki	Lower Palaeolithic tools
-do-	-do-	Mendori	Medieval Brahmanical sculptures
-do-	-do-	Muktapur	Lower palaeolithic tools

District	*Taluk*	*Village/Site*	*Cultural assemblage*
Raisen	Raisen	Mundiakhera	Medieval Brahmanical sculptures
-do-	-do-	Murelkhurd	Stupas, ruined temple and medieval sculptures
-do-	-do-	Murlikheri	Tank and *sati-pillar* of medieval period
-do-	-do-	Mushkabad	Rock-shelters and Paramara sculptures
-do-	-do-	Nagori	Microliths, rock-paintings, sculptures of Sunga and medieval periods, fragment of an inverted lotus and stone structure
-do-	-do-	Narkhera	Rock-paintings and inscription painted in shell characters
-do-	-do-	Naroda	Tank and *sati-pillar* of medieval period
-do-	-do-	Nimkhera	Microliths, medieval Brahmanical sculptures and pillar
-do-	-do-	Pagnesar	Medieval sculptures and ruined Paramara temple
-do-	-do-	Pipalia	Lower Palaeolithic tools
-do-	-do-	Pipalkhiria	Lower Palaeolithic tools
-do-	-do-	Ratanpur (Buddha)	Rock-paintings, microliths, medieval sculptures and stone structure
-do-	-do-	Ratanpur (Girdhari)	Sunga, Gupta and Medieval sculptures and .raft-pillar
-do-	-do-	Ratatalai	Medieval sculptures, tank and *sati*-pillar
-do-	-do-	Saiyidganj	Lower Palaeolithic tools
-do-	-do-	Sakasen	Ruined stupas medieval sculptures and stone structure
-do-	-do-	Salamatpur	Medieval sculptures and *sati-pillar*
-do-	-do-	Sanchi	Microliths and Sunga and Medieval sculptures
-do-	-do-	Sarchampa	Medieval sculptures, fort, well, tank and residential buildings
-do-	-do-	Satdhara	Rock-paintings, stupas, monasteries and ancient pathway leading to stupas
-do-	-do-	Satkunda	Microliths and rock-paintings
-do-	-do-	Semra	Tank and . *sati*-pillar of medieval period
-do-	-do-	Shahpur	Fort, well, stone structure and ^aft-pillar
-do-	-do-	Silwaha	Lower Palaeolithic tools
-do-	-do-	Sojna	Lower Palaeolithic tools
-do-	-do-	Sua	Lower Palaeolithic tools
-do-	-do-	Suakheri	Medieval sculptures
-do-	-do-	Sunari	Lower Palaeolithic tools
-do-	-do-	Tajalpur	Medieval Brahmanical sculptures, tank and *sati*-pillar
-do-	-do-	Tigra	Medieval Brahmanical sculptures and *sati*-pillar
-do-	-do-	Uncher	Medieval sculptures
-do-	-do-	Unida	Lower Palaeolithic tools

The tools of the Lower Palaeolithic industry include choppers, scrapers, handaxes and cleavers made on quartz and Vindhyan sandstone. The sites which yielded fairly large number of tools are Agariachopra, Biskhera, Gopisar, Gulgaon, Khabai, Mandha, Mandwai, Ratanpur (Girdhari), Ratatalai, Sarchampa, Satkunda, Uncher, etc. The microliths include blades, scrapers, points etc.

The paintings in rock-shelters are executed in red and white colour and depict scenes of dancing, hunting and war, besides human and animal figurines. In some of the rock-shelters many layers of paintings superimposed one above another were also noticed.

The fragmentary Brahmi inscription of *circa* first-second century B.C., noticed at Besar, reads *Kudugaru Karikha (ta).* Besides, a small piece of spotted Chunar sandstone with Mauryan polish, an elephant pillar-capital, fragments of an octagonal pillar and inverted lotus and a bull-capital were also found. Fragments of an octagonal pillar, pieces of inverted lotus and a bull capital were noticed at Bhagwanpura Colony.

Noteworthy among the sculptures noticed during the exploration include Balarama (Sunga period) from Mehgaon, Mahishasuramardini (pre-Gupta period?) and *yakshi {circa* first century B.C.) from Ratanpur (Girdhari), *yaksha {circa* first-second century B.C.), Ganesa and his consorts (Paramara period) from Bhagwanpura Colony, four-armed Vishnu (Paramara period) from Tajalpur.

The mound near Fatehpur-marmata, located on the bank of the river Halali, yielded sherds of red, black-and-red wares, besides an ear-stud and a terracotta disc belonging to the early historical period.

Maharashtra

15. EXPLORATION IN DISTRICT AHMEDNAGAR.—In the course of exploration in the valley of the river Pravara, a tributary of the Godavari, in Shrirampur Taluk, Shri L. S. Rao of the South-western Circle of the Survey discovered a chalcolithic habitation site at Fatyabad, yielding late Harappan and Jorwe black-on-red pottery and a chalcolithic burial site probably belonging to Jorwe culture at Padegaon.

16. EXPLORATION IN DISTRICT CHANDRAPUR.—In the course of exploration in Brahmapuri Taluk, Shri G. K. Mane of the South-western Circle of the Survey discovered a megalithic burial site with nearly one hundred stone-circles situated around a 10-m high mound, yielding micacious red ware with paintings in black and black-and-red ware, at Kahali, a habitation site probably belonging to the Satavahana times, yielding brick structures and terracotta figurines at Udapur and a site yielding microliths consisting of blades, bladelets and lunates made on chalcedony at Bandegaon. Besides, some megalithic stone-circles were also noticed at the other end of the last mentioned site.

Shri S. N. Raghunath of the South-western Circle of the Survey noticed a factory site belonging to Lower Palaeolithic industry on a hill slope and a terrace of the river Pranahita at Bamragarh in Sironcha Taluk. The tools include handaxes, cleavers, cores, flakes and blades made on quartzite.

17. EXPLORATION IN DISTRICT DHULE.—Shri V. L. Dharurkar of the South-western Circle of the Survey, in the course of his exploration in Sindkhed Taluk, discovered late Harappan sites at Shevraballi, Varsus and Walkheda. The vast mound at Varsus, situated on the river Burai, yielded besides pottery of the chalcolithic and historical periods, terracotta figurines, chert blades and conch-shell bangle pieces, one of which bears engraved designs showing resemblance with the Harappan script.

18. EXPLORATION IN DISTRICT NASIK.—In the course of his exploration, Shri Arun Kumar, Research Fellow in the Deccan College Post-graduate and Research Institute, Pune, studied natural river exposures at Gangawadi (10 km upstream of Nasik), Gangapur (2 km downstream), Niphad, Nandur Madmeshwar (11 km upstream of Niphad), Ghatagemaharaj section (Nasik), Manur (5 km downstream), Eklehre (7 km further downstream), Varhe Dharna (8 km further downstream) and sections on tributaries at Krishnagaon (on the Unada nadi, at its confluence with the Deonadi), Duogaon (on the river Alandi), Dindori and Rolus (on the river Kadva).

Middle Palaeolithic artefacts, mainly scrapers, were recovered from basal gravel-bed, exposed in the river-bed at Nandur Madmeshwar. Microliths were collected from top surface of the terrace, consisting of old alluvium. Three flakes of Acheulian character were extracted from gravel exposed in the river-bed at Gangapur. Geological samples were collected both vertically and horizontally from the above-cited localities for detailed sedimentological studies.

Molluscan shells were recovered *in situ* scattered in the gravel deposit (3.0-3.7 m thick) exposed at Nandur Madmeshwar, for dating by C-14 method. The gravel bed is implementi-ferous and fossiliferous *(Indian Archaeology 1969-70—A Review,* p. 24)[1]. Few sandy silt samples of soil, rich in micro-molluscan forms, were also collected from Gangapur, Gangawadi, Niphad and Varhe Dharna for understanding the palaeoenvironment. At Gangawadi, well-preserved fossil of *Bos* sp., a fragment of mandible with teeth intact, was found.

19. EXPLORATION IN DISTRICT PUNE.—In the course of exploration, Drs S. N. Rajaguru, R. S. Pappu and A. R. Marathe of the Deccan College Post-graduate and Research Institute, Pune, located a rich site yielding microliths on the right bank of the river Ghod, 1.5 km north-west of Inamgaon. The tools were lying on exposed portion of the Terminal Pleisto-cene pebbly sandy gravel, occurring 8 m above the modern bed level of the Ghod. Two small trial trenches were sunk in the implementiferous gravel with a view to studying the stratigraphy.

The exposed surface is represented by calcrete which was found to be capping brownish silty clay (0·7 to 1·0 m). The silty clay at places is interlayered by well-sorted pebbly sandy gravel. This formation is underlain by sandy pebbly gravel (0.5-0·7 m thick). This gravel is sub-rounded, moderately sorted and is rich in basalt and silica pebbles. Limonitic staining, present on the gravel, suggests periodic drying of palaeo-channel of the Ghod. A large number (about 228) of microliths were recovered from the gravel. Good number of fresh water molluscan shells have also been collected from the gravel and have been dated by C-14 dating to about 12,000 years B.P.

The gravel grades to brownish fissured clay (0·7 m thick) which in turn rests over the colluvio-alluvial pebbly gravel at a depth of 1.2 m below the surface of the trench.

Preliminary typological studies of the excavated material reveals that the assemblage consists of blades, burins, scrapers, points, borers, lunates and fluted cores. All tools are more or less fresh and are made on varieties of cryptocrytalline silica. On the typological grounds the industry can be labelled as non-geometric microlithic industry.

The study of exposed Quaternary sediments not only around the site but also in the vicinity of Inamgaon, shows that these tools belong to the Terminal Pleistocene aggradational phase of the Ghod and are about 12,000 years old.

Punjab

20. EXPLORATION IN DISTRICTS LUDHIANA, PATIALA, ROPAR AND SANGRUR.—In the course of his exploration, Shri G. B. Sharma of the Department of Tourism, Cultural Affairs, Archaeology and Museums, Government of Punjab, discovered the following sites.

[1]This publication will hereafter be referred to by the year only.

District	*Village/Site*	*Cultural assemblage*
Ludhiana	Jhagrodi	Late Harappan, Grey ware and Early historical
-do-	Katana	Late Harappan, Grey ware and Early historical
-do--	Pail	Grey ware, Early historical and Medieval
-do-Pa	Qila Kandela	Medieval
tiala	Banera	Late Harappan and Medieval Late
-do--d	Bhore	Harappan and Early historical
o--do-	Bishanpur (Chhanna)	Medieval
-do-	Brihma	Early historical
	Chanarthal Kalan	Late Harappan, Grey ware, Black-slipped
-do-		ware and Medieval
-do-	Chandiala	Late Harappan, Grey ware and Medieval
-do-	Dablan	Late Harappan and Painted Grey Ware Late
	Dandrala	Harappan, Painted Grey Ware, Grey ware,
		Black-slipped ware and Early historical
-do-		Late Harappan, Painted Grey Ware,
	Dhammomajra	Black-slipped ware, Early historical and
-do		Medieval Late Harappan and Medieval Late
--do	Galbaddi	Harappan, Painted Grey Ware, Grey ware
-	Hansali	and Black-slipped ware
		Late Harappan, Early historical and
-do-	Isar Hail	Medieval
		Medieval
-do-	Jalberi Dhumi	Medieval ,Medieval
-do-	Kalauli Kalwan I	Late Harappan and Medieval
-do-	Kalwan II	
-do-		Ochre-coloured pottery and Medieval
-do-	Kheri Gaurian	Late Harappan, Painted Grey Ware, Grey
-do-	Kumbhara	ware, Black-slipped ware and Medieval Late
		Harappan and Medieval
-do-	Lachkani	Late Harappan, Painted Grey Ware,
-do-	Majri Jattan	Black-slipped ware and Medieval
		Medieval
-do-	Mandaur	Early historical
-do-	Mule-Pur I	Grey ware
-do-	Mule-Pur II	Late Harappan, Early historical and
-do-	Nohra	Medieval
		Late Harappan and Early historical
-do-	Pinaundian	Medieval
-do-	Pir-Jain	Early historical and Medieval
-do-	Ramgarh Chhanna	Painted Grey Ware, Grey ware and
-do-	Raungala	Black-slipped ware

District	*Village/Site*	*Cultural assemblage*
Patiala	Rohta	Late Harappan, Painted Grey Ware, Grey ware, Black-slipped ware, Early historical and Medieval
-do-	Rorewal	Medieval
-do-	Salana	Painted Grey Ware and Early historical
-do-	Seona	Medieval
-do-	Sheikhpur	Painted Grey Ware, Grey ware, Black-slipped Ware and Medieval
-do-	Suniarheri	Late Harappan, painted Grey Ware, Grey ware and Black-slipped ware
-do-	Ucha Gaon	Late Harappan and Early historical
Ropar	Bassi Gujaran	Late Harappan, Painted Grey Ware and Early historical
-do-	Manela	Late Harappan and Grey ware
Sangrur	Bharthala	Grey ware
-do-	Dhingi	Late Harappan, Painted Grey Ware, Grey ware, Black-slipped ware, Early historical and Medieval
-do-	Gaggarpur	Early historical
-do-	Godde Majra	Medieval
-do-	Jambhere-da-Theh	Early historical
-do-	Majri	Medieval
-do-	Manhere-da-Theh	Medieval
-do-	Mohammadpur	Late Harappan

Rajasthan

21. EXPLORATION IN DISTRICT ALWAR.—In the course of his exploration, Shri K. P. Chaudhary of the Delhi Circle of the Survey noticed sites belonging to historical times at Raisisi and Rawan-ka-Dehra in Alwar Taluk and Tatarpu, Thikani and Thikani-ka-bas in Kishangarh Taluk.

22. EXPLORATION IN DISTRICT BHARATPUR.—In the course of his exploration, Shri B. S. Negi of the Delhi Circle of the Survey noticed Painted Grey Ware sites at Bagdhari, Bhandore, Borai, Jheelra, Kama, Kasot, Nagla Methna, Pala, Santruka, Sinpini and Tatamar and sites belonging to the historical times at Astawan, Bansi Khurd, Nagla Tuheeram Sabora and Syorana in Bharatpur Taluk. A few sherds of black-and-red ware were also picked up from the site at Jheelra.

23. EXPLORATION IN DISTRICT BHARATPUR.—Sarvashri Lai Chand Singh, R. P. Sharma, Budhi Singh and B. S. Negi of the Delhi Circle of the Survey explored along the banks of the river Banganga from Halena to Bachchrain in Weir Taluk, and noticed: sites yielding black-and-red ware, Painted Grey Ware and early historical pottery at Rahmagarh and Sarsena; mounds yielding historical remains at Biawari, Mouloni and Niwari; architectural members belonging to the medieval times at Mouloni and Rahmagarh; and buried ruins of a medieval fort at Rahmagarh.

24. EXPLORATION IN DISTRICTS JAIPUR, JHUNJHUNU AND SIKAR.—Sarvashri R. C. Agrawala and Vijai Kumar of the Department of Archaeology and Museums, Government of Rajasthan discovered the following sites.

District	*Village/Site*	*Cultural assemblage*
Jaipur	Achrol	Ochre-coloured pottery and microliths
Jhunjhunu	Jodhpura-Sonari	Ochre-coloured pottery, Black-and-red Ware, Painted Grey Ware and microliths
-do-	Rampura	Historical
Sikar	Ageri	Ochre-coloured pottery
-do--d	Bayka	Ochre-coloured pottery
o--do-	Bhitali Gaondi	Ochre-coloured pottery and microliths
-do--d	Bhojpura	Ochre-coloured pottery
o--do-	Bhuralya	Ochre-coloured pottery
-do--d	Byorka	Ochre-coloured pottery and microliths
o--do-	Chiplata	Ochre-coloured pottery
-do--d	Gaonri	Ochre-coloured pottery and copper slags
o--do-	Gaonri Bandh	Ochre-coloured pottery and copper slags
-do--d	Ghata	Ochre-coloured pottery
o-	Jhulna Tila	Ochre-coloured pottery and microliths
	Kulhade-ka-Johad	Ochre-coloured pottery
-do-	Kulra	Ochre-coloured pottery and copper slags
-do-	Kumhareri	Ochre-coloured pottery and microliths
-do-	Kuradhan-ki-Doongri	Ochre-coloured pottery and copper arrow-head
-do-		
-do-	Malyali	Microliths
-do-	Meeno-ki-Dhani	Ochre-coloured pottery and microliths
-do-	Nayavali	Microliths
-do-	Nimodh	Ochre-coloured pottery and copper slags
-do-	Para Bhitar-ki-Dhani	Ochre-coloured pottery and copper slags
-do-	Partheri	Ochre-coloured pottery and microliths
-do-	Pyojara	Ochre-coloured pottery
	Tapkeshwara Chavandea	Ochre-coloured pottery
	Tejawala	Ochre-coloured pottery
	Thoi	Ochre-coloured pottery and microliths
	Umrawala	Ochre-coloured pottery, copper slags and microliths

Tamil Nadu

25. EXPLORATION IN DISTRICT CHINGLEPUT.—In the course of his exploration, Shri Shivananda Venkat Rao of the Southern Circle of the Survey discovered a Middle Palaeolithic site at Peramanallur, yielding borers made on quartzite, points of chalcedony, fluted cores of chert and other tools in various stages of manufacturing, besides a heavily patinated polished stone axe of the neolithic culture (pl. II A). A medieval site yielding red ware was also noticed towards north-east of the above village.

Near Arappakkam, disturbed megalithic burials of cairn-circle type, ranging in diameter from 5"5 to 7.0 m, were noticed.

Early historical sites yielding Russet-coated Painted Ware with dotted vertical lines on the exterior and thick horizontal lines on the interior, were noticed at Kovilur in Polur Taluk and Kalpattu on the bank of the river Amiridhi.

26. EXPLORATION IN DISTRICT NORTH ARGOT.—Shri Hanumanthappa Telugu of the Southern Circle of the Survey, during the course of his exploration, noticed a neolithic site at Kolundampattu in Chengam Taluk, yielding finished as well as unfinished tools of the pecked and ground stone industry.

Megalithic cairn-circles, ranging in diameter from 6 to 15 m, were noticed near Govindarajapuram, Kambattu, Kilpasar, Kilravandavadi, Kolundampattu, Melpasar Mottakkal, Namakkal, Pondai, Putturchekkadi, Reddiyappalaiyam, Sennandipatti, Tiruva-dattanur and Tondamanur, all in Changam Taluk, besides dolmens and menhirs at Tondamanur (pi. II B). A site with urn-burials was also noticed at Serpattu.

Sites belonging to medieval times, yielding coarse red and black wares, were noticed at T. Vellur and Reddiyappalaiyam on the right bank of the river Pambar and at Malainurche-kkadi. Baked-brick structures, besides usual pottery of the medieval times, were noticed at the last-mentioned site.

Uttar Pradesh

27. EXPLORATION IN DISTRICT BUDAUN.—Professor R. C. Gaur, assisted by Shrimati N. Zuberi, Sarvashri K. K. Mohammad, N. H. Zaidi, Mohammad A. Alvi and Mohammad Abid, of the Department of History, Aligarh Muslim University, in the course of exploration discovered the following sites.

District	*Village/Site*	*Cultural assemblage*
Budaun	Abdullahganj (Khilwali Tal)	Plain black-and-red ware, early historical pottery, red ware of Kushana period and Medieval pottery
-do-	Atapur	Medieval pottery
-do-	Bangarh	Black-slipped ware and Medieval pottery
-do-	Binawar	Painted Grey Ware, plain black-and-red ware, black-slipped ware and Glazed ware
-do-	Chandra Mau	Early historical pottery, Late historical red ware and medieval pottery
-do-	Gulariya	Ochre-coloured pottery, Painted Grey Ware, Early historical and Medieval pottery
-do-	Ismailpur	Medieval pottery
-do-	Kumar Gaon	Early historical pottery, Late historical red ware and Medieval pottery
-do-	Mohammadpur (Vihar)	Early historical pottery, Red ware of Kushana period and Late historical red ware
-do-	Nathu	Early historical pottery and red ware of Kushana period
-do-	Qadar Chowk	Medieval pottery

District	*Village/Site*	*Cultural assemblage*
Budaun	Rafiabad	Ochre-coloured pottery, plain black-and-red ware, Painted Grey Ware, Glazed ware and Early historical pottery
-do-	Ramzanpur	Medieval pottery
-do-	Sheikhpur	Medieval pottery and Glazed ware
-do-	Sirsa Ther	Ochre-coloured pottery, plain black-and-red ware, black-slipped ware, Painted Grey Ware, Glazed ware, Early historical pottery, red ware of Kushana period and Medieval pottery
-do-	Ujhani	Medieval pottery
-do-	Unaula	Glazed Ware, black-slipped ware and red ware of Kushana period
-do-	Utrana	Painted Grey Ware, black-slipped ware, Early historical pottery, red ware of Kushana period and Late historical red ware

28. EXPLORATION IN DISTRICT ETAWAH.—During the course of his exploration in Bidhuna Taluk, Dr G. A. Qamar of the Northern Circle of the Survey discovered a site yielding Painted Grey Ware and Northern Black Polished Ware and its associated wares at Bidhuna. The sites yielding Northern Black Polished Ware, black-slipped and fine grey wares were noticed at Malhausi, Sahar and Saunthra. Besides, sites yielding early historical and medieval vestiges were noticed at Barkasi, Bela, Bhainsauri, Madhuapur, Madhuapur (Garhi), Bhadaura and Patti Yaqubpur. A late medieval temple was also noticed at Madhuapur.

Besides, he noticed sites yielding medieval pottery at Aghar, Anison, Athesi, Badshahpur-Chonk, Barru Keolasar, Bhadaura, Bhainsauri, Bhatauli, Bhitragaon, Damarpur, Dhorhra, Fatehpur, Hardu, Jauhar, Jiva Sirsani Parsu, Kanauli, Kanmau, Kursi, Lakhi, Lakhnu, Marokha, Murha Chhadamilal, Oron, Palia, Passauli, Phaphund, Piprauli Sheo, Ponthi, Purwa Mana, Siunj and Tajpur Phaphund. A sculpture of a goddess, probably belonging to Gupta period, and an inscription in ninteeth-century Devanagari script were noticed at Karauli.

29. EXPLORATION IN DISTRICT FARUKKHABAD.—Sarvashri R. K. Chaturvedi, Rakesh Tewari and Hem Raj, under the general supervision of Shri R. C. Singh of the Department of Archaeology, Government of Uttar Pradesh, explored the area in and around Kannauj and brought to light sites yielding Painted Grey and Northern Black Polished Wares and pottery of the early historical times, at Club Ghar Tila, Gwal maidan, Shikhana mound, Qila mound and Lallan miyan-ka-roja situated in the vicinity of Kannauj, besides sites revealing medieval vestiges at Dahelpur, Makarand Nagar, Rajgiri and Salempur and two medieval temples built in *lakhauri* bricks at Chintamani and Dahelpur.

30. EXPLORATION IN DISTRICTS FATEHPUR, JAUNPUR, PRATAPGARH AND SULTANPUR.—Professor G. R. Sharma, assisted by Sarvashri V. D. Misra, R. K. Varma. D. Mandal B B Misra, J. B. Pal, R. Singh, B. G. Pandey, D. P. Sharma, P. Sinha, D. N. Tiwari and M. C. Gupta of the Department of Ancient History, Culture and Archaeology, University of Allahabad carried out exploration in the above Districts and discovered the following sites.

Epipalaeolithic sites yielding patinated fluted cores, flakes and blades showing bold retouching and made on cherty material were noticed at Mandah, Shalhipur and Suleman Parbatpur in Patti sub-division of District Pratapgarh.

The survey brought to light twenty-four Mesolithic sites, of which eight are located in Machhalishahar sub-division of District Jaunpur, thirteen in Patti sub-division of District Pratapgarh and the rest in Kadipur sub-division of District Sultanpur. Noteworthy among the sites are Bhat Pura, Lohina, Nagauli, Pure Gambhir Shah and Pure Ganga Mani in District Jaunpur, Harraipatti, Pargaspur, Ramchandrapatti and Thakthaiya in District Pratapgarh and Ragaipur in District Sultanpur. The sites have been classified into two categories, viz., geometric and non-geomatric on the basis of presence or absence of geometric shapes in the industry. Among the explored sites, only Lohina, Nagauli and Pure Gambhir Shah yielded geometric tools. The tool types include blades, blunted backed blades, points, lunates, scrapers and micro-burins made on chert, chalcedony, agate and carnelian. Though the tools are diminutive they show minute retouching.

Chalcolithic sites, yielding short blades, showing crested ridged technique, black-slipped, black-and-red, grey and red wares were discovered at Akahwa in District Jaunpur and Itwa and Kanpa in District Pratapgarh. Noteworthy shapes encountered in the pottery are bowls with everted rim, pedestalled bowl, dishes and funnel-shaped lids or bowls.

It is interesting to note that all the sites belonging to Mesolithic and Chalcolithic cultures are distributed on the banks of nullahs as well as on the banks of small rivers whereas the sites belonging to the Epipalaeolithic period are situated on the banks of the nullahs only.

The sites yielding Northern Black Polished Ware, black-slipped, plain grey and red wares were noticed at Bahua, Baragaon, Kasraon, Kolakhas, Rampur and Reh in District Fatehpur, Gajahar Mau in District Jaunpur, Gobindpur in District Pratapgarh and Noorpur and Surajbhan Patti in District Sultanpur. In some of the sites ring-wells (Kotlakhas and Reh) and remains of brick structures were also noticed.

Besides, sites with remains of early medieval period were discovered at Baragaon, Chintapur, Gambhiri, Hathigaon, Kirtikhera, Kotlakhas, Naubasta, Sankha, etc. in District Fatehpur and sculptures at Chintapur, Hathigaon, Kirtikhera, etc.

31. EXPLORATION IN DISTRICT LUCKNOW.—Sarvashri R. K. Chaturvedi, Rakesh Tewari and Hem Raj, under the general supervision of Shri R. C. Singh of the Department of Archaeology, Government of Uttar Pradesh, in the course of exploration in Mohanlal Ganj Taluk, discovered sites revealing early historical remains including pottery and beautiful terra cotta figurines of Gupta period at Hulaskhera and Parwar-Pachhim. A sculpture of *Eka-mukha Siva-linga* was also noticed at Hulaskhera. Remains of baked brick structure, probably belonging to Kushana period were noticed at Dahiar. Sites yielding medieval vestiges were noticed at Badan-Khera, Korora, Musiari-Devi, Perhata and Utrawan. Besides, several sculptures includ ing Kubera, Siva-Parvati and head of Siva, belonging to medieval period were also noticed at Kujahata.

32. EXPLORATION IN DISTRICT MEERUT.—During the course of his exploration, Shri C. P. Singh of the Northern Circle of the Survey discovered the following sites.

District	*Village/Site*	*Cultural assemblage*
Meerut	Abdullahpur	Medieval temples
-do-	Alipur Jijmana	Early historical
-do-	Aurangabad	Medieval temples

District	*Village/Site*	*Cultural assemblage*
Meerut	Badla Kaithwada	Ochre-coloured pottery, Medieval temples and sculptures
-do-	Chandauri	Early historical
-do-	Dabaka	Early historical
-do-	Eklakhnagar	Early historical
-do-	Ghosipur	Early historical
-do-	Gyanpur	Mosque
-do-	Hazipur	Painted Grey Ware
-do-	Kaserkhei'a	Mosque
-do-	Kharkhauda	Medieval tank and mosque
-do-	Ladpur	Medieval tank
-do-	Medpur	Early historical, terracotta beads and silver coins of Iltutmish
-do-	Nagla Mai	Early historical, Medieval temples and tank
-do-	Panchgaon Patti Gopal	Early historical
-do-	Phaphunda	Medieval temples, tank and mosque
-do-	Rasulpur	Medieval temples
-do-	Salempur	Mosque
-do-	Uldaypur	Early historical

33. EXPLORATION IN DISTRICT MIRZAPUR.—In continuation of last year's work *(1978-79,* p. 58), Sarvashri R. K. Chaturvedi, Rakesh Tewari and Hem Raj, under the supervision of Shri R. C. Singh of the Department of Archaeology, Government of Uttar Pradesh, in the course of their exploration discovered sites in and around Banbaira Pahar and Jaugarh, yielding blades and blade-tools showing affinity with the tools from the Upper Palaeolithic and Epi-Palaeolithic Ages of the Belan valley in Districts Allahabad and Mirzapur. Besides, Mesolithic sites were located near Bhaluhi Pahari, Churiharwa nullah, Darhwa nullah, Karman, Lakhania, Lusa, Rampur and Sidh Nath-ki-Dari. Rock-shelters with paintings were noticed at Banbaira Pahar (Nikarika), Lekhania Pahar (Rajapur), Pahti-Dari and Sidh Nath-ki-Dari. Some of the rock-shelters yielded microliths also. Neolithic celts were collected from the sites at Darwan, Khoradih and Lusa. Besides, megalithic sites were noticed at Banbaira Pahar, Rajapur and Sakteshgarh.

34. EXPLORATION IN DISTRICTS TEHRI AND UTTAR KASHI.—In the course of exploration of submersible area under the Tehrai Dam Project, Sarvashri R. K. Chaturvedi, Rakesh Tewari and Hem Raj, under the supervision of Shri R. C. Singh of the Department of Archaeology, Government of Uttar Pradesh, noticed: early historical sites at Bilsod, Khand Dhar Mandal, Nandgaon and Siloli; medieval sculptures at Badethi, Baldogi, Banali, Bonr, Deval, Dharwal, Dharasu, Hadiadi, Hatwal, Kangsali, Kot-Chaura, Maldeval and Sain; medieval fort at Uppu; late medieval temple at Deval; remains of platforms *(Garh)* at Chah, Chhotgaon, Khand Dhar Mandal, Mathiali, Myundah, Siloli, Swati and Tipri; and *samadhis* of saints, belonging to Gorakhnath cult, at Badethi, Dharasu and Hadiady. It was also noticed that few of the *samadhis* have inscriptions in Devanagari script.

B. Problem Oriented Surveys

Andhra Pradesh

35. Exploration in District Prakasam.—With a view to ascertaining the neolithic pattern of the Gundlakamma river basin Shri D. Hanumantha Rao of the South-eastern Circle of the Survey in the course of his exploration discovered a neolithic site at Chollavidu, situated at the confluence of the Rallavagu nullah with the Gundlakamma river. Besides, he also located two megalithic stone-circles at Yellammakonda in Akkapalle village limits and hundreds of megalithic burials at Bodireddipalle, a hamlet of Kasinenipalle in Markapur Taluk.

Gujarat

36. Exploration in Districts Jamnagar and Mahesana.—Professor R. N. Mehta of the M. S. University of Baroda conducted exploration at Ghumali (District Jamnagar), the capital of the Saindhavas and the later rulers, with a view to understanding the urban pattern of the settlements. The survey revealed that initially it might have been an open town which seems to have been fortified at a later stage. This small town had a single road running from the Rampor gate inside the city, lying on the western side of Bhrugukundani-Zar, in its last stage. Its centre is marked by Navalakha temple and the ruins of a palace which has already been destroyed by the treasure hunters. The site was found to have more than 2-m thick deposit of habitation debris. Some loose sculptures, stylistically ascribable to the seventh-eighth century A.D. were also noticed. In the valley, on the sides of Bhrugukundani-Zar temples, it was observed that the area was levelled by raising a platform, over which were built structures. Besides, a series of water reservoirs were also traced outside the Rampor gate. The earth-work between the tank and Son-Kansari indicates the presence of check-dams to store water.

Professor R. N. Mehta and Dr V. S. Parekh of the M. S. University of Baroda and Dr C. Margabandhu of the Western Circle of the Survey explored Anhilwad Patan for its urban pattern and sculptural wealth, and noticed shifting pattern of the urban settlement and the development of the water resources of the area. It was observed that the remains of the capital of the Chalukyas are strewn in the Anawada area and to the west of the present fortified town. The widespread destruction, caused by modern brick robbing and levelling for agricultural purposes, has done extensive damage to the site. More than three hundred sculptures were noticed and documented.

Jammu and Kashmir

37. Exploration in District Jammu.—In the course of exploration in Akhnoor Taluk, Sarvashri G. S. Gaur and J. M. Thapar, under the guidance of Shri S. N. Jaiswal of the North western Circle of the Survey, discovered the following sites.

District	*Taluk*	*Village/Site*	*Cultural assemblage*
Jammu	Akhnoor	Bakore	Early medieval
-do-	-do-	Devipur	Late medieval Siva temple
-do-	-do-	Hamirpur	Siva temple (first half of nineteenth century A.D.)
-do-	-do-	Kalit	Fort (eighteenth century A.D.)
-do-	-do-	Mutthi	Medieval site and mosque of tenth century A.D.
-do-	-do-	Maira	Medieval
-do-	-do-	Nad	Kushana period
-do-	-do-	Naraina	Medieval

Haryana

38. EXPLORATION IN DISTRICT GURGAON.—While exploring the Sahibi valley in the Pataudi Sub Tehsil, Shri R. P. Sharma brought to light Late Harappan sites at Basonda, Jasat and Noorgarh and Ochre-coloured pottery at Khandavla and Josikalan.

Karnataka

39. EXPLORATION IN DISTRICT GULBARGA.—In continuation of his earlier field-work, Dr K. Paddayya of the Deccan College Post-graduate and Research Institute, Pune, carried out further exploration in Hunsgi valley with a view to ascertaining the density and distribution of the Acheulian and other Stone Age sites. This intensive survey, practically covering the whole of the valley (the valley floor as well as the tablelands flanking it), yielded thirty more Acheulian localities as per details given below.

Site	*Number of localities*
Arikera	1
Baichbal	1
Benkanhalli	1
Benhatti	3
Chikhebbal	1
Devapur	2
Gulbal	3
Hunsgi	10
Kachaknur	1
Kaldevanhalli	2
Kupi	2
Malnur	3

With the exception of a few alluvial localities, all the sites were found to be connected with occupation activities. They are in the form of surface scatters of stone artefacts and other categories of occupation debris with definite limits of horizontal distribution. Most of them are located on the streams flowing into the Hunsgi nullah. The largest of these clusters are located at Hunsgi, Benhatti and Kachaknur. For example, the locality at Kachaknur covers an area of 250 X 80 m. Like the earlier assemblages, these assemblages are also characterized by the use of limestone as the principal raw material and represent an early facies of the Acheulian tradition. The significance of these discoveries for understanding the settlement patterns and other aspects of the Acheulian culture of the Hunsgi valley is as follows: (i) The number of Acheulian localities (fifty) necessitates the revision of the estimates of sizes of Acheulian population groups; (ii) a number of these localities are associated with rocky ridges along streams, indicating Acheulian man's preferance for ridges for camping; (iii) some of the new sites are located in the foot hill area of tablelands where there are no known perennial sources of water, and these sites were probably occupied during the wet season; and (iv) the rich and extensive nature of some of the localities and also the differential preservation of some of the stone artefacts support the earlier inference that some of the localities witnessed repeated occupation by man.

The survey also brought to light about fifteen Mesolithic localities at Benhatti, Gulbal, Kaldevanhalli, Kupi and Malnur. Some of these localities are located on the tablelands and thus imply improved adaptive strategy of subsistence.

Kerala

40. EXPLORATION IN DISTRICTS MALAPPURAM AND PALGHAT.—In continuation of the earlier work *{1971-72,* p. 27), Shri P. Narayana Babu, assisted by Shri M. Raman Namboodiri of the Southern Circle of the Survey, while investigating for the sites showing Roman contact in the Ponnani valley, discovered: megalithic burials of *topikal* type at Alancode, Ongallur (pi. Ill A), Ponumundum, Tennala, Thannairkod and Thavanur; menhirs near Thirunavaya (pi. I B) and Thavanur; rock-cut burial caves excavated in laterite outcrop at Ongallur and Vanniamkulam, of which the burials at the latter site have square plan with entrance facing west and a small opening on the top; and medieval temples, ascribable to the thirteenth-fourteenth century A.D. at Cherukattupalam, Chudavalam, Ongallur and Ponmundam, of which the temples at the first two places bearing mural paintings depicting scenes like Siva as Kiratamurti, Gajendramoksha, Venugopala with consorts, Trivikrama, Vishnu as Mohini and Narasimha, etc. on the outer circular walls.

Madhya Pradesh

41. EXPLORATION IN DISTRICT DEW AS.—Shri M. Umamaheshwara Rao of the Central Circle of the Survey, while exploring the Dewas Taluk for tracing the extent of the Kayatha culture, noticed the following sites.

District	*Village/Site*	*Cultural assemblage*
Dewas	Balakheri	Medieval sculptures
-do-	Bhasuni	Medieval sculptures
-do-	Dhabla	Medieval sculptures
-do-	Dhamani	*Sati* pillar
-do-	Jangli	*Sati* pillar
-do-	Khajuria	*Sati* pillar
-do-	Merkheri	Black-and-red ware
-do-	Mundaheda	Black-and-red ware, Medieval sculptures and *sati* pillar
-do-	Nalesara	Black-and-red ware and Medieval sculptures
	Sinduria	Medieval sculptures
-do-	Sumrakhera	Medieval sculptures
	Sunwanigopal	*Sati* pillar
-do-	Sutli	Medieval sculptures
	Tumraoda	Medieval sculptures
-do-		

Kayatha Ware was found at Bilawali while from Merkhai, Mundaheda, Nalesara, chalco-lithic black-and-red ware was reported.

42. EXPLORATION IN DISTRICTS EAST NIMAR AND WEST NIMAR.—Drs S. N. Rajaguru and R. S. Pappu of the Deccan College Post-graduate and Research Institute, Pune and Professor P.V. Sowani of the Fergusson College, Pune, undertook geoarchaeological studies in the middle reaches of the Tapi valley. The region surveyed includes parts of Khandwa-Burhanpur gap,

Satpura plateau between Shirpur and Sendhwa, and the piedmont zone between the Satpuras and the northern bank of the Tapi between Burhanpur and Shirpur (District Dhulia in Maharashtra). The river Aner, one of the most important northern tributaries of the Tapi, was also surveyed almost from its source in the Satpuras to its confluence with the Tapi in Khandesh plain. During these studies, exposed cliff-sections on the banks of streams and dug-well sections were examined and the sediment samples were collected for laboratory studies. These field studies revealed the following important aspects of the Quaternary history of the central Tapi valley.

Structural dips in basaltic flows and silicified breciated basalts in Satpuras support the earlier view that the Satpuras have been affected by tectonic movements of Neogene. Presence of hot springs and regional lineaments in the source region of the Aner also suggests relative tectonic instability of the region.

The Aner was possibly flowing towards west of Shirpur during the Tertiary and changed its course towards south in the Tapi, probably during the early Pleistocene.

In the source region of the Aner, an erosional surface is well developed on varieties of basalts at 300 m above mean seal level. There is thick (15-20 m) colluvio-alluvial sedimentary fill preserved in ancestral stream valleys belonging to the erosional surface.

In the Tapi valley proper, two distinct alluvial fills were noted at number of places. Basal unit is composed of well-cemented and subrounded bouldery gravel and reddish brown concretionary silty sand. This unit is disconformably overlain by colluvio-alluvial gravels inter-layering with yellowish brown moderately calcreted silty sand. The exposed alluvial cliffs range in height from 6 to 30 m above the bed level of streams. At Burhanpur, the alluvial cliff is 20 m high. Bad land topography has developed in the alluvial plain of the Tapi around Shirpur. Cliffs as high as 30 m are seen in modern ephemeral nullahs draining into the Tapi.

The observation on number of dug-wells in the piedmont zone shows that fluvio-lacustral environment predominated in the Tapi valley prior to the deposition of coarser bed load . gravels of later Pleistocene Age.

Calcretization of exposed alluvial deposits, dominance of bed-load sedimentation in the upper (20 m below the surface) portion of the alluvium and the absence of iron concretions in these deposits indicate that the climatic conditions remained more or less semi-arid seasonal throughout the later Quaternary.

Excepting surface microlithic sites, no Palaeolithic site of primary interest was located in the context of Quaternary stratigraphy during this short survey.

Maharashtra

43. EXPLORATION IN DISTRICT AHMEDNAGAR.—Dr Mate of the Deccan College Post-graduate and Research Institute, Pune, assisted by Shrimati K. Chavan and Shrimati U. Ranade, in the course of exploration under the project 'search and recording of the paintings of the seventeenth and eighteenth centuries murals, miniatures and manuscript illustrations,' noticed murals in the Hari-Narayan Math at Benavadi. The upper parts of the walls of the square cell and the ceiling of the dome are covered with murals which are probably executed in A.D. 1750. The themes consist of the *Dasavataras, Matsyabheda, Gopi-vastraharana* and other mythological subjects. The paintings are executed against a white ground which is unusual in this region and show unmistakable influence from Karnataka and possibly from Andhra Pradesh. Another noteworthy object noticed is a manuscript copy of the Dasabodha by Ramdas, written and painted in the last decade of the seventeenth century A.D. It was noticed some fifty years back but its significance from the point of art history was never realized. It is written and painted in silver and golden inks on a dark green paper and contains portraits of many seventeenth century personages never seen before.

44. EXPLORATION IN DISTRICT SHOLAPUR.—In the course of his exploration in the Bhima valley to find out the possible diffusion of the late Harappan elements, Shri S. N. Raghunath of the South-western Circle of the Survey discovered the Middle Palaeolithic sites at Chinchkuyal, Dharang, Kakrej, Karmala, Khanapur and Shegaon. However, the sites at Chinchkuyal, Kakrej, Kahnapur and Shegaon also yielded microliths including blades and scrapers made on chalcedony. Besides, a site yielding microlithis was noticed at Sidhtek and an ash-mound yielding burnished grey ware at Dattabudi.

Manipur

45. EXPLORATION IN IMPHAL VALLEY.—Professor R. V. Joshi, Drs S. N. Rajaguru, R. S. Pappu and Shri T. Angou Singh of the Deccan College Post-graduate arid Research Institute, Pune, Shri O. K. Singh of the Department of Archaeology, Government of Manipur, Shri T. Subol Singh of the State Museum, Manipur, Dr H. C. Sharma of the Gauhati University and Shri D. K. Medhi of the Arya Vidyapeeth College, Gauhati carried out geoarchaeological investigations in the Imphal valley with a view to examining the evidence for Quaternary environment and to assess the potentialities of prehistoric cultures in this unexplored region. Investigations were concentrated in the central and southern parts of Manipur State and particularly in the Loktak lake basin.

Preliminary studies revealed the formation of Quaternary fluvial terraces developed on the Tertiary landform which emerged from the sea.

There is no geological evidence of Quaternary glacial or periglacial climate up to an elevation of about 1500 m above mean sea level. In fact ferruginous (oxidized) cement and matrix of gravel formations suggest sub-tropical climate during the Quaternary. In the source region of Imphal valley, 50 km due north of Imphal city, gravel fill (20 to 30 m thick) cone terraces are present at 1200 m, 1000 m and 900 m above MSL, comparable to those observed in the Banganga and Sirsa valleys in Himachal Pradesh. These gravel fill surfaces are the product of colluvio-alluvial processes characteristic of a mountainous region. The hill ranges surrounding the Imphal valley rise up to 3000 m above MSL and steep slopes of these high hills have favoured fairly thick formations of colluvio-alluvial gravels. The present course of Imphal river cuts through these gravel terraces. Neither stone tools nor animal and plant fossils were discovered in the gravel exposed in the road sections. The present Imphal river meanders through a vast aggraded plain of fluvio-lacustral origin. The Loktak lake probably represents a remnant of once mighty lake which was carrying higher water sometimes during the Quaternary. Evidence for changes in lake levels were observed in the dug out trenches in the Loktak hydroelectric project area and at Singda dam site. Fluvio-lacustral clays occur a few metres above the present aggraded surface, while fluvial gravels alternate with fluvio-lacustral clays at 3 m, 5 m and 10 m levels below the surface. Besides, carbonaceous clays are found to alternate with greyish, at times ferruginized (suggestive of drying of the lake) clays. These geomorphic features definitely suggest changes in the water budget of the lake during the Quaternary.

Pollen studies coupled with C-14 dating of various carbonaceous clays are likely to throw light on the late Quaternary environmental changes in this sub-tropical parts of India.

No Stone Age artefacts were obtained during this brief reconnaissance survey. Several natural caves are reported in the limestone formation in the Ukhrur area which contain animal bones and breccia along with stone chips and tools. The stone tools from Ukhrur preserved in the Department of Archaeology, Government of Manipur, were examined but their antiquity and their taxonomic characters could not be properly established. However, a chopper on quartzite collected from Machi in District Tengnoupal, 40 km due south-west of Imphal and presently preserved in the State Museum, Manipur, shows similarity with those met with in

Himachal Pradesh. Further work is necessary in this practically unexplored area to gauge its prehistoric potentialities.

Meghalaya

46. EXPLORATION IN DISTRICTS EAST AND WEST GARO HILLS.—In continuation of the last year's *(1977-78,* pp. 42-43) work, a team consisting of Drs R. V. Joshi, S. N. Rajaguru, R. S. Pappu of the Deccan College Post-graduate and Research Institute, Pune, Drs T. G. Sharma, H. C. Sharma and S. Roy of the Department of Anthropology, Gauhati University and Shri D. K. Medhi of the Arya Vidyapeeth College, Gauhati carried out geoarchaeological investigations in Garo Hills. The exposed Quaternary deposits were re-examined in the valleys of the Rongram river, the Ganol, the Waram, the Nangal and the Simsang. Besides, Stone Age sites at Michimagiri, Nangalbibra, Rongram and Thebronggiri were also studied in the context of local geomorphology.

In the earlier explorations two cut and fill terraces, ranging in heights 25 m and 5 m above the modern bed levels of various streams, were observed in the region. The older alluvial fill (25 m) is found to be more weathered and oxidized than the younger alluvial fill (pl. IV A). The geomorphological observations and laboratory tests on the sediments show that these alluvial fills have developed in response to tectonic and climatic changes of the Quaternary age. During the recent exploration, the team located remnant patches of ferruginous pebble conglomerate resting on bedrocks at elevations varying from 540 to 610 m above MSL in the vicinities of the Rongram and the Waram valleys. The conglomerate represents a prior channel system of early (?) Pleistocene age. Similar palaeo-channels have also been located in Simsang valley near Nangalbibra.

On the basis of last two years field-work in Garo Hills the following geomorphic sequences can be enumerated.

Garo Hills emerged out of sea in geologic past some 40-50 million years ago. Since then the region seems to have experienced tectonic movements as well as climatic changes. Erosional surfaces varying in heights from 1500 to 700 m above MSL, cut and fill terraces in various river valleys and the rejuvenated courses of many streams indicate dynamicity of geomorphic processes during the later Tertiary and the Quaternary times.

Occurrence of thick (10 m) colluvial gravels in Simsang valley at Nangalbibra and of colluvio-alluvial silts right in the source regions of streams such as the Rongram certainly indicate that there was considerable stripping of the superficial soil mantle during the late Pleistocene. Sub-tropical Garo Hills were probably experiencing relatively drier climatic conditions and thinner forest cover during the late Pleistocene.

Earlier surveys in this tribal area had yielded Stone Age as well as neolithic sites. All the tools of these cultures are exclusively made on basalt or dolerite. As far as neolithic cultures are concerned here is the richest area having several factory sites and numerous clusters of implements. The Stone Age cultures contain a few standardized Lower Palaeolithic forms like handaxes and cleavers; however, the scrapers and points as also choppers are numerous. Many of these exhibit clear biface characters but on the whole these pre-neolithic industries are typical in nature. In this respect they are comparable to similar tool-kits from Konkan and Kerala on the West Coast. A factory site, situated in the Michimagiri hills, has yielded large number of blades and a few burins recalling Upper Palaeolithic cultures. The Meghalaya and the West Coast region constitute two contrasting geographical zones of the Indian sub-tropic; the similarity in prehistoric cultural development is, therefore, interesting. The region is well suited for ethno-archaeological studies and it was possible to witness the Jhum cultivation and annual festivals of the tribes. The tribes predominently depend on the cane, bamboo and wood for

making implements. For storage of water they commonly use bottle-gourd, pitchers, etc. Their present way of life gives the idea of the neolithic cultural stage.

In this survey Stone Age industries could not be firmly related to the Quaternary terrace succession of the area due to the lack of facilities for excavation at the sites like Thebronggiri.

Rajasthan

47. EXPLORATION IN DISTRICT BANSWARA.—Professor R. N. Mehta of the M. S. University of Baroda and Drs C. Margabandhu and B. L. Nagarch of the Western Circle of the Survey, conducted exploration at Arthuna, the capital of the Vagada branch of the Paramaras with a view to understanding the urban pattern of settlements. The survey revealed the presence of an open town with temples distributed on the outskirts of the town as well as inside it. Presence of structures of rubbles and unpaved roads were also noticed. Large-scale agricultural operation destroyed a large part of the mound, but the town pattern is fairly clear.

48. EXPLORATION IN DISTRICTS CHURU AND SIKAR.—Under the Art Survey project of the Department of Archaeology and Museums, Government of Rajasthan, Shri V. S. Shrivastava conducted a preliminary survey of the mural tradition in paintings in Shekhawati and contiguous areas, the chief sites being Bhaleri, Churu, Ratangarh, Salasar, Sardarshahar and Sujangarh in District Churu and Fatehpur, Ganeri, Ganeshwar, Ramgarh and Sikar in District Sikar. The paintings noticed in these sites range in date from eighteenth century A.D. to modern times. They decorate the exterior as well as the interior walls of the religious and secular buildings such as temples, cenotaphs, *havelis,* step-wells, etc. Though the *Puranic* themes dominate, no aspect of life is excluded in these murals. It is interesting that *havelis* of the Jaina *seths* are also decorated with Hindu themes. At Sardarshahar, the fight between Surya and Rahu, the theme unknown in the sculptural art, finds delineated. Love-lores and folk themes such as Dhola-Maru, Binja-Sorath, Laila-Majnu, Heer-Ranjha, Jalal-Boobna, etc. famous saints and heroes and their deeds also formed the subject matter of these murals. The murals, belonging to the British period, show the European life-style and portraits of Queen Victoria, George V, Edward VII, etc. Sometimes symbolic drawings and graphs are also represented. The inscriptions noticed in the cenotaphs of Poddars (A.D. 1861) at Ramgarh and *havelis* of Vijaivargiya (A.D. 1925) at Ganeshwar, record the local rates of various commodities on a particular day.

49. EXPLORATION IN DISTRICT NAGAUR.—In continuation of the last year's *(1977-78,* pp. 45-46) work in western Rajasthan, as a part of multi-disciplinary research project on the 'Early Man and his Environment in north-west India, with special reference to the Luni Basin in Rajasthan,' a team consisting of Drs V. N. Misra, S. N. Rajaguru, P. K. Thomas and Shri Zahid Husain of the Poona University and the Deccan College Post-graduate and Research Institute, Pune and Drs D. P. Agrawal and P. S. Datta of the Physical Research Laboratory, Ahmadabad, carried out extensive field-work in and around Jayal, a Lower Palaeolithic site.

One of the major finds in this season was the discovery in the vicinity of Jayal and small town 52 km east of Nagaur of an extensive gravel ridge and of probably the earliest human occupation in the area.

The gravel ridge is 40-70 m high above the plains composed of fluvio-aeolian sediments of late Quaternary age. The gravel ridge which runs roughly in northeast-southwest direction has been dissected into two sub-ridges by modern fluvial processes. The gravel exposure towards Jayal town is found as a thin (about 1 m) veneer capping the massive crystalline calcrete which is extensively developed in the area.

Detailed studies have shown that the gravel is composed of sub-rounded boulders and cobbles of varieties of metamorphic quartzites, vein quartz and quartzitic sandstone. Minor litho-components are represented by gneiss, quartzitic schist, etc. Sub-rounded boulders and cobbles have been laid down in a matrix of yellowish brown silty sand and are cemented by calcium carbonate. Poor sorting, presence of sub-angular chips of local rocks such as fine-grained gneiss and sandstone show that the gravel formation represents prior braided channel bar deposited by a stream carrying seasonal but strong discharge. The gravel formation, therefore, represents semi-arid climatic conditions.

It is very difficult to date the gravel formation due to total absence of materials suitable for radiometric and palaeontologic dating. The dating has been attempted by considering the general geological and geomorphological history of the region. The area under consideration emerged out of sea some 50-60 million years B.P. Since then the continental geomorphological processes have played a dominant role in shaping the landscape. The gravel has been laid down by streams which drained the western slopes of the Aravalli mountain range at a time when the western Rajasthan had a higher relief than that of the present day. Such a situation existed in the late Tertiary and early Pleistocene when the Himalayas were rising and the Gangetic fore-deep portion was subsiding. The gravel formation, therefore, represents a relict landform of the late Tertiary or early Pleistocene age. The climate during this period was more humid than that of the present day.

The entire gravel ridge was found to be very rich in palaeolithic tools. In order to establish stratigraphic position of the tools, small trenches (1 X 1 m) were sunk at various locations. Further, surface sampling was also completed at one spot where there was relatively higher concentration of tools.

Among the four trenches sunk on the gravel ridge, situated in the revenue jurisdiction of Jayal, the first trench (Jayal I) was on the top of a gravel ridge, while Jayal II, III and IV were on another gravel ridge. Jayal II was at the base of the ridge, while Jayal III and IV were located on the crest and the mid-slope of the ridge respectively. Following is the composite stratigraphy (from top to bottom) observed in all these trenches.

Depth below the surface	*Nature of the deposit*	*Cultural assemblage*
0-20 cm	Greyish loam, rich in sub-angular to sub-rounded pebbles of quartzite. Poorly consolidated.	Lower Palaeolithic tools
20-100 cm	Bouldery, cobbly sub-rounded gravel, well cemented.	Lower Palaeolithic tools down to a depth of 40 cm only.

The distribution of tools in the three trenches (Jayal II, III and IV) shows that trench IV, located on the mid-slope has yielded the highest number (154 or 45'3 per cent) of tools. Trench II situated on the periphery of the ridge has yielded 117 or 34·7 per cent artefacts while trench III located on the crest has yielded only 68 or 20 per cent artefacts. The explanation for this asymmetrical distribution is that artefacts from the top of the ridge have been washed down and concentrated on the mid-slope and to a lesser degree at the bottom of the ridge. The effeective archaeological horizon of the gravel ridge is in the top 30 cm deposit.

The artefacts are all made of quartzite. A preliminary analysis of the material from these trenches shows that of the 456 artefacts only 17.98 per cent are finished tools and the remaining are flakes and cores. Among the finished tools scrapers form the largest group (53.66 per cent) followed by the handaxes (13.41 per cent). Other types represented are choppers, chopping tools, denticulates, notches and knives.

The excavation carried out at Chhajoli, about 2 km south-west of Jayal, yielded similar industry. The trial excavations at Jayal and Chhajoli, therefore, prove beyond doubt that the gravel ridge is older than the occupation of early man.

The controlled surface collection from an area of 4 x 4 m on the mid-slope of a gravel ridge on the north-eastern bank of the Rata *nadi* yielded 433 artefacts, giving an average of 27 artefacts per square metre. The distribution of artefacts is fairly uniform in all the squares. The percentage of finished tools in the surface collection is very high (55.43 per cent). The principal tool-types (pl. Ill B) are scrapers (28.75 per cent), truncated flakes (9·17 per cent), knives (7·92 per cent), discoids (6.25 per cent), handaxes (5.83 per cent), denticulates (5.42 per cent), choppers (3.75 per cent) and chopping tools (2.50 per cent). There are only two cleavers. Essentially the industry consists of flake-based tools.

Like sub-Sahara, the Thar desert was occupied by early man since Lower Palaeolithic times. The occupational site on the surface of a fossil gravel ridge is probably one of the richest Lower Palaeolithic sites so far discovered in deserts of the world. Considering the area covered by the ridge and the density of artefacts on the ridge, it appears that the ridge was occupied by large populations for a considerable time. Though it is difficult to disentangle the various stages of palaeolithic occupation, two stages of occupation can certainly be postulated on the basis of surface and stratified materials. On typological grounds the stratified material represents Early Acheulian stage and the surface material represents Late Acheulian and Post-Acheulian stages. It appears, therefore, that the raw material on the ridge continued to be exploited for a long time from Early Acheulian period onwards.

Besides, microliths were collected near Khinyala sandstone quarry and from the surface of the stabilized dune along the northern shore of Didwana salt lake. The microliths are made on chert and chalcedony.

Tamil Nadu

50. EXPLORATION IN DISTRICT KANYAKUMARI AND TIRUNELVELI.—In order to correlate the neolithic environments and cultures of Kerala with those of the region of *Tens* in southwestern Tamil Nadu *(1972-73,* pp. 30-32), Drs R. V. Joshi, S. N. Rajaguru and Shri P. Rajendran of the Deccan College Post-graduate and Research Institute, Pune, explored coastal parts around Kanyakumari, Nagercoil and Tiruchendur. During their exploration several microlithic sites were examined in relation to local coastal geomorphology, and soil samples were collected for laboratory studies.

At Idindakarai, about 25 km east north-east of Cape Comorin, large number of microlithic tools were collected along with the good number of fish bones and shells from a calcreted platform occurring 4 m above high tide level. Reddish *Teri* sands were observed a few metres away from the microlithic site. The sequence of geological formations observed on the coast at Idindakarai shows that Late Tertiary limestone and shale are exposed as basal rocks and are overlain by beach rock at 2 m elevation above the high tide level. The beach rock is 1.5 m thick (and composing large number of mega shells). The top surface of the beach-rock is rich in land snails which indicates recession of the sea from the area for a long time. These land snails have been dated to 20,000±395 years B.P. (B.S. 134). Small test pits were taken in the contact zone of the *Teri* sands and the calcreted surface. No microlith was found with the *Teri* sand. It is observed that generally the microlith clusters occur on the outcrops of granites

where modern sands have been removed. Microliths are made on chert, jasper and quartz and tool-types represented being backed blades, crescents, points, scrapers and a few burins.

Another surface microlithic site was discovered on a raised marine flat (6 m above mean sea level) on the left bank of Alangara creek near Rammacapuram and about 1 km upstream of the mouth of the creek, which is situated about 56 km from Tiruchendur on way to Kanya-kumari. The basal rocks are fossil tidal clays rich in calcareous nodules. They are overlain by beach rock at 3 m above the water level in the creek. The basal part of beach rock is rich in oysters and the upper part in shells. The thickness of the beach rock is 2 to 3 m. Large number of microliths were collected on the exposed calcreted surface of beach rock and also on the stabilized slopes of *Teri* sands which are found to cap the beach rock. Microliths were not found in *Teri* sands proper.

At Kanyakumari, an excellent wave-cut cliff (6 to 8 m high) is exposed a few hundred metres west of Gandhi Memorial. The basal rock in the cliff is gneiss which is overlain by beach rock of about 5 to 6 m thickness. The beach rock is rich in mega shells. The top surface of the beach rock is calcreted and is rich in land snails. The *Teri* sands are found to be resting unconformably on the calcreted surface of the beach rock. Shells collected from the middle (4 m above the mean sea level) of the beach rock have been dated to 29,890±955 B.P. B.S. 134). A few microliths were collected from the top surface of *Teri* dune sands.

At number of places in well and fresh road cutting sections *Teri* sands are found to be resting on beach rocks, calcretes, ferricretes and weathered Pre-Cambrain gneiss. At Muttum near Nagercoil, *Teri* sands are deeply dissected up to a depth of 10-15 m. Nowhere microliths were found in the main core of *Teri* sands, thereby suggesting that the microlithic industry is post-Tm in age.

Preliminary laboratory analyses of *Teri* sands show that they are well-sorted dune sands. Iron oxide (Fe 203) varies from 6 to 10 per cent and mineral composition is represented by quartz, felspar, mangnetite, illmenite, rutile and garnet. These chemical and mineralogical studies did not help to find out the exact cause of red colouration of *Teri* sands. Simple pedological processes fail to explain more or less uniform reddish colour of *Teri* sands to a depth of 10 to 15 m. Clear pedological horizons are also absent in *Teri* sands.

If the two Carbon-14 dates of beach rock and land snails are accepted as reliable, then the *Teri* sands appear to have been deposited either in the terminal Pleistocene or in the early Holocene. It is, therefore, quite likely that these littoral dunes formed when the sea level was lower than today.

Thus these studies prove that there is hardly any correlation between the occurrence of microlithic tools and the stratigraphy of *Teri* sands.

Typologically, the *Teri* microlithic industries are comparable to those from Kerala. While the former are made on chert, jasper and quartz the latter are exclusively on quartz. Kerala and *Teri* region presently have contrasting environmental set up, their mesolithic cultures are, however, identical.

West Bengal

51. EXPLORATION IN DISTRICTS BANKURA AND MIDNAPORE.—With a view to ascertaining the cultural association and chronological horizon of the chance finds of Copper Hoards in the region, Miss S. Bose of the Eastern Circle of the Survey undertook an exploration of these Districts and surveyed the sites at Aganibani situated on Champa (District Midnapore) and Bhaktabandha, near Ban Aeuria. No associated finds at these places were found.

2. EXCAVATIONS A. NATIONAL PROJECTS AND MAJOR EXCAVATIONS

Andhra Pradesh

1. EXCAVATION AT SATANIKOTA, DISTRICT KURNOOL.—In continuation of the last year's *(1977-78,* pp. 3-11) work, the Excavations Branch (I) of the Survey, Nagpur, resumed excavation at Satanikota, under the guidance of Shri N. C. Ghosh, assisted by Dr H. N. Singh, with a view to: (i) ascertaining the complete plan of the fortification; and (ii) exposing structures, if any, inside the fortified area.

Excavation on the eastern, western and southern periphery of the mound revealed the entire plan of the fortification wall (fig. 3), which was found to be elliptical but irregular in outline. On the eastern periphery, where land gently slopes down towards the river along the outer margin of the moat, a huge embankment having nearly sixty-three courses of Cuddapah stone slabs (pl. IV B), measuring 2.25 m at the widest and traced to a length of 36m, was encountered. The moat, in all its likelihood, retained by its embankment, ended against the rock-face at the north-eastern corner, beyond which the fort-wall remains only as a brick parapet wall on the edge of the escarpment; the river Tungabhadra flows nearly 9 m below this point. On the northern periphery the existence of the moat could not be established, and it is possible that the gorge below, covering almost half of the site, might have served the purpose. On the eastern side, the fortification-wall along with the moat could be traced to a considerable length, though the wall is in a very damaged state of preservation. The filling of the moat could be through rain water.

The fort covers an area of approximately five hectares and measures 34.2 m north-south and 17.8 m east-west at the widest and 13.5 m at the narrowest. The entrance to the fort was probably through more than one gate as the steps provided for the exposed gateway on the south could be used for only pedestrian traffic. It is apparent that the wall on the northern periphery at least was used in medieval period during which time its height was raised.

Dr A. N. Singh, Assistant Geologist of the Geological Survey of India, Nagpur, subjected the Rouletted Ware and the black-and-red ware recovered from Period II to semi-quantitative estimation by Emission Spectrographic Analysis and X-ray Analysis in order to determine the composition of both the wares. Analyses revealed that both the wares are exactly similar in mineralogy and structure. It may be inferred that these ceramic industries are local in nature, for the samples do not exhibit any difference of chemical composition and mineral contents. It is also felt that the black-and-red ware effect achieved on the Rouletted Ware is due to coating or application of some organic oily substance at required areas over the surface of the pot before firing.

2. EXCAVATION AT VAMULAPADU, DISTRICT KURNOOL.—The Excavations Branch (I) of the Survey, Nagpur, under the direction of Shri N. C. Ghosh, assisted by Dr H. N. Singh and Sarvashri K. Ismail, R. K. Roy, K. M. Girhe and A. U. Ganar, carried out excavation at old Vamulapadu, half a kilometre north of new Vamulapadu in Nandikotkur Taluk, with a view to unearthing the antiquarian remains of the site threatened with submergence as a result of the Srisailam Irrigation Hydel Project.

The site, approximately 4.77 hectares in area, is completely disturbed due to earth quarrying by the nearby villagers. Digging to a depth of 20 to 30 cm revealed the bedrock in all the ten trenches excepting two. The occupation deposit was found to belong to the

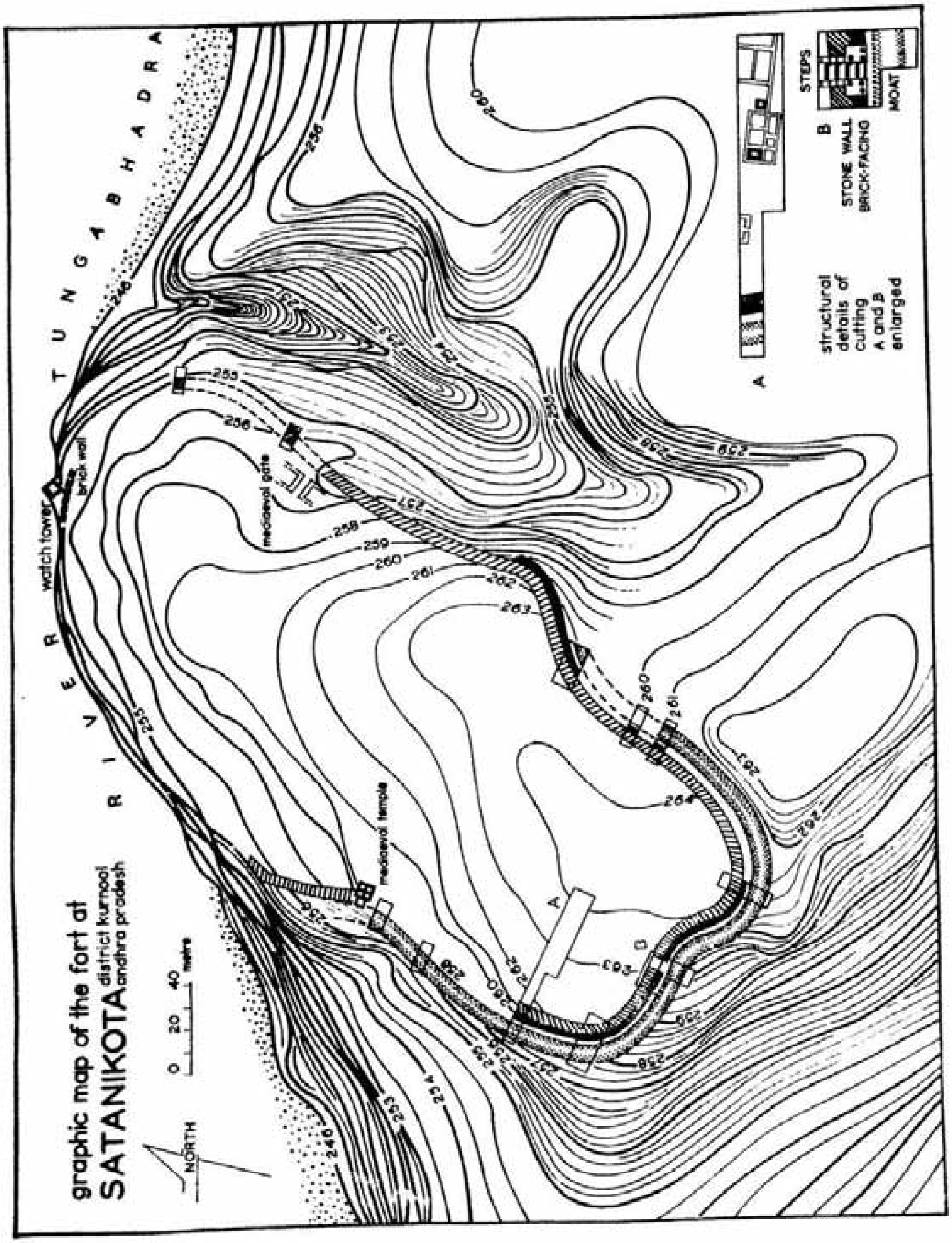

graphic map of the fort at
SATANIKOTA district kurnool andhra pradesh
0 20 40 metre
NORTH
RIVER TUNGABHADRA
watch tower
brick wall
mediaeval gate
mediaeval temple
A
B
structural details of cutting A and B enlarged
STONE WALL
BRICK-FACING
STEPS
MOAT

Fig. 3

early historical times as evident from sherds of black-and-red ware comprising bowls, lid-cum-bowls, pots and dishes. A few sherds of the Rouletted Ware were also collected from the surface. Nearly 2 km north-east of the site, along the southern bank of the river Bhavanasi, a few patches of conglomerate bed with an average thickness of 50 cm and capped by a brown silt were noticed. The conglomerate yielded Lower Palaeolithic tools, including discoidal scraper, bifacial copper on a thick core and a sub-triangular flake with crescentic facetted platform and a wide angle of percussion; the tools are on quartzite with a thin patination and are slightly rolled (pl. V A).

3. EXCAVATION AT KUDAVELLI, DISTRICT MAHBUBNAGAR.—The Excavations Branch (I) of the Survey, Nagpur, under the guidance of Shri N. C. Ghosh, assisted by Dr H. N. Singh and Sarvashri H. P. Sinha, D. K. Ambastha, K. Ismail, S. K. Mitra, A. K. Ghosh, Mohinder Singh, N. G. Banerjee, P. M. Bhope, S. J. Moriya, K. M. Girhe, R. K. Dwivedi, R. K. Roy, M. U. Qureshi, Pyara Singh and A. U. Ganar, carried out excavation at Kudavelli, situated at the confluence of the rivers Krishna and Tungabhadra, with a view to establishing the cultural sequence of the site before its submergence due to the Srisailam Irrigation Hydel Project. The excavation revealed a two-fold cultural sequence—Period I and II with a sub-division in the latter as II A and II B—in a total deposit of 5.2 m.

Period I (beginning of the fourth century A.D. to the sixth century A.D.) is represented by four phases of structural activity in a deposit of 1.6 m. A channel-shaped oven, lined with baked bricks with edges burnt and containing ash, exposed to a length of 1.14 m and running east-west, was encountered in the lowest level. Among the several stone walls exposed in the same level a huge wall running north-south (pls. V B and VI A), with a width of 2.3 m, built of irregular Cuddapah stones is, however, noteworthy. This wall, having eleven courses of stones as foundation, was found running under Sangamesvara temple, built in eighth century A.D. It was traced 50 m further south of the temple, the space in between remaining unexcavated. Another equally huge wall 2.66 m in width and thirteen courses in extant height built of Cuddapah slabs, was also encountered in this phase. These walls do not represent the remains of a normal house. A circular stone structure with two extant courses containing ash was another noteworthy structure of this phase. Phase IV is represented by two shrines built of baked bricks (size: 44 X 24 X 7 cm). Shrine 1, facing east, is rectangular in plan, measuring 3·84 X 2.87 m with a small (1.96 X 0.87 m) front porch. A brick-built pedestal was found attached to the centre of the back wall of the *garbhagriha*. Shrine 2, also facing east, was encountered immediately north of the above-mentioned one. Since the major portion of this shrine underlies the Sangamesvara temple, details of its plan could not be ascertained. The floors of the shrines as well as of the courtyard were paved with stone slabs and repaired at least twice.

The pottery of this Period is mainly represented by red-slipped and dull-red wares which together constitute nearly 82 per cent of the total assemblage. The red-slipped ware is represented by vases, jars and some decorated sherds, whereas the dull-red ware accounts mainly for bowls with flat base, vases and *lotas* with round base. Other important ceramics include red polished black-and-red and black-polished wares. Red polished ware (fig. 4, nos. 3, 28-30), accounts for only 1164 per cent and includes sprinklers, spouts with stainer back, cups and bowls. The most enigmatic type, however, is a couple of single mould-made twin pots with convex profile and attached to a common mid-wall. It is provided with horizontal strap-handle with perforations on either end. Two such specimens are in red polished ware (fig. 5) and only one in Kaolin Ware. Black-and-red ware is represented in two varieties, slipped and unslipped (fig. 4, nos. 5, 6 & 7). The ware accounts for only 4·62 per cent of the total assemblage. Bowls with featureless rim and tapering sides characterize the former, while bowls with slightly incurved rim distinguish the latter. The black-polished ware is akin to the red polished ware both in fabric and texture. The cups and a solitary example of a spout are represented in the

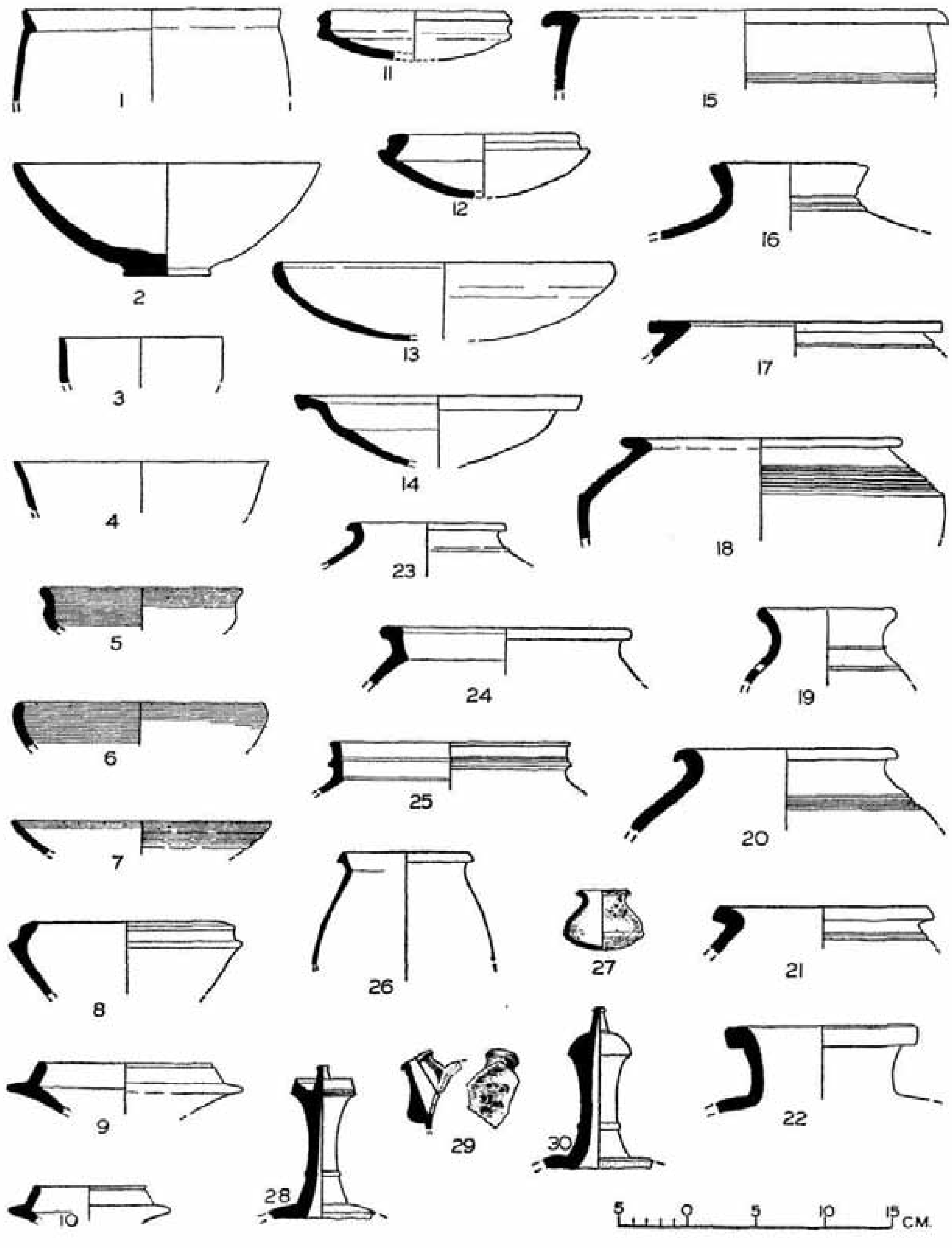


FIG. 4 *Kudavelli : Pottery, 1-7, 15-19, 28-30, Period I ; 8-11, 20-21, Period II A ; 12-14, 22-27, Period II B*

black polished ware (fig. 4, no. 4). In the red slipped ware (fig. 4, nos. 1, 15, 16 & 18) vases, jars and some decorated sherds (fig. 6, nos. 1-9) are encountered, whereas in the dull red ware (fig. 4, nos. 2,12 & 19) the maintypes are blows with-flat bases and *lotas* with round base.

It is interesting to note that the frequency of the black-and-red ware in the earlier levels of the historical period in southern Deccan is quite high. At Satanikota *(1977-78,* pp. 5-9) in Period II the occurrence of the black-and-red ware is as high as 19 per cent. The types and techniques of this ware continued from the earlier megalithic tradition, and significantly enough diminish in frequency in the later part of the early historical level (4·62 per cent at Kudavelli).

Of all the antiquities collected from Period I, two gold coins (pl. VII A), one belonging to the Roman emperor Constantius II (A.D. 337-361) and the other one (half cut) belonging to the second Byzantine emperor Anastasisus (A.D. 491-518) are noteworthy. Though the two coins have two perforations on the upper edge for using them as pendants, the cancellation marks on the obverse of these coins indicate that they were in circulation, duly authorized by the native kings. Secondly, the presence of these coins in Andhra Pradesh suggests that the Romans and the Byzantines had trade relationship with this part of India even after the third century A.P- Besides, two coins are very much damaged and worn out to be identified definitely. However, one of these coins, bearing elephant on the obverse and Ujjaini symbol with a crescent on the reverse, appears to belong to the late Satavahana period. The legend on the obverse could not be restored completely, but letters such as *sa, ta* and a part of *ka* could be identified, which are obviously parts of the legend *Satakarni.*

The other antiquities which represent Period I include: beads of terracotta, glass, semi-precious stones, shell; ear ornaments of terracotta and glass (pl. VIII A); discs, wheels, spindle-whorls of terracotta, stone; bangles of shell, glass; iron spearhead, nails; and copper rings and antimony rods. A stone plaque (8 X 12 cm) carved in low relief snowing a seated female figure (pi. VII B), holding a trident in the right hand, was recovered from the late levels of this Period. The most noteworthy find belonging to this Period is, however, a circular seal in soapstone (pl. VIII B), obtained through surface exploration. It has a handle on the back, and bears a legend in Brahmi characters of third-fourth century A.D., in the negative, which can be read as *Kalabhasa* or *Kalabhasya.* The letter *bha* has rather an unusual appearance. There are only traces of another letter on the left and which may be restored as *sa* or *sya.* The seal thus seems to belong to a person named Kalabha.

A 30-cm thick silt seals the remains of the Period I. This deposit is mainly encountered in the northern part of the mound. Occupation was resumed in Period II after a gap of nearly two hundred years.

Period II A (eighth century to twelfth century A.D.) is remarkable, for it witnessed the foundation of the early Chalukyan Sangamesvara Siva temple. Besides, a number of brick-built shrines, contemporary to the foundation of the temple, were exposed around its *prakara.* Shrine 1 measures 5.6 X 4.4 m. Internally, however, it is paved with stone slabs. Shrine 2 is badly damaged, and the third shrine is square on plan (3·9 X 3.8 m) having *a pranala* on the north below which remains of another brick shrine belonging to Period I was traced. Size of the brick used in these shrines, on an average, measures 18 X 15 X 7 cm. In all these shrines traces of brick built pedestals attached in the centre of the back wall were noticed.

The ceramic industry of the Sub-period is represented by red-slipped, dull-red, dull-black, black-slipped and chocolate-slipped wares (fig. 4, nos. 8, 9, 10, 20 & 21). Diagnostic pottery of this Sub-period is, however, the chocolate-slipped. Some of the pots were also decorated (fig. 6, nos. 10-12 & 13).

Other important finds recovered from this Sub-period include: beads of terracotta, glass, shell (pl. VIII C) and semiprecious stones; bangles of glass and shell; rings of shell, glass and copper; spindle-whorls and tops of stone and terracotta of which tops of terracotta have small

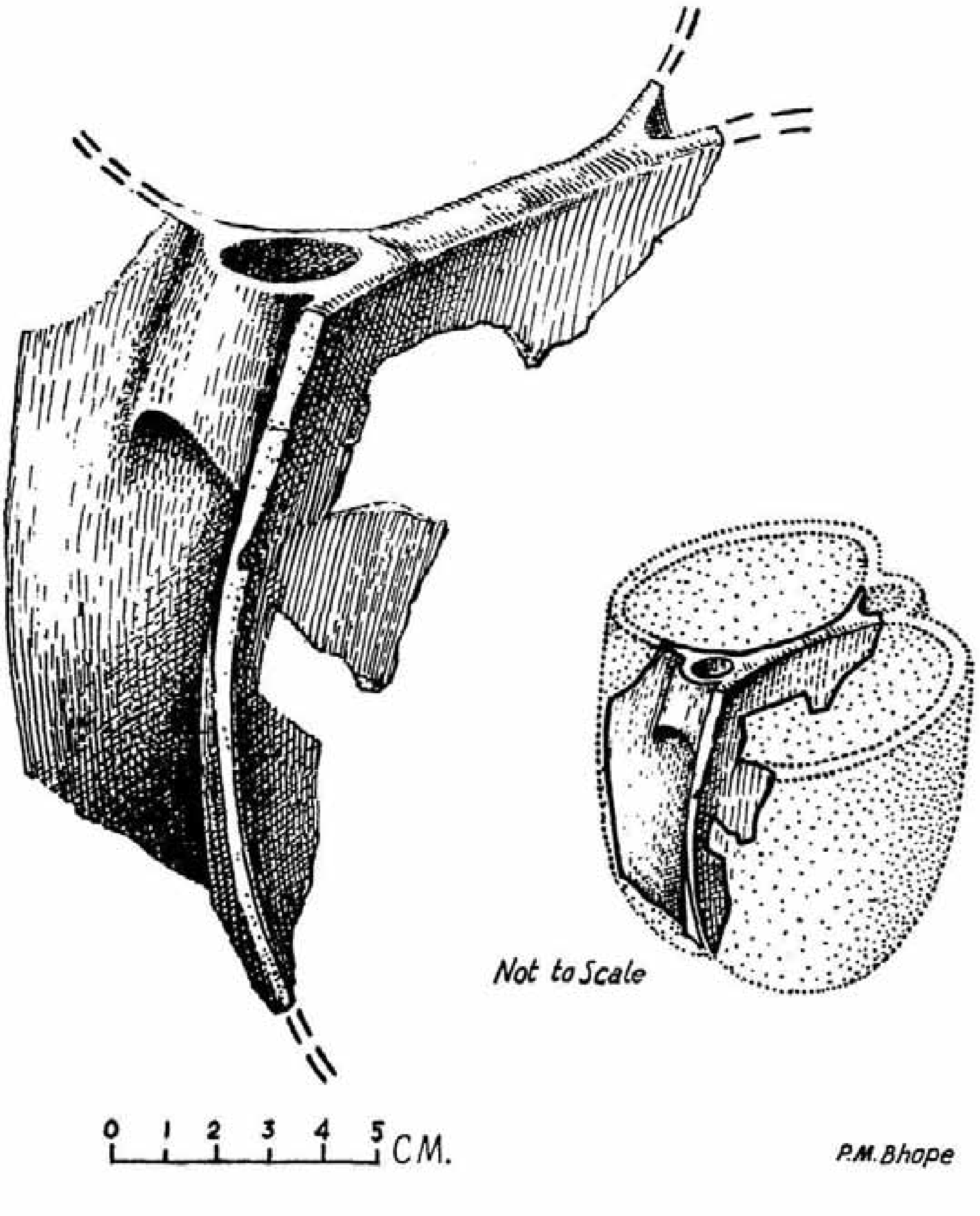


FIG. 5 *Kudavelli : red polished ware, Period I*

iron nails inserted through the centre; stone balls of varying sizes; terracotta ear ornaments (pl. VIII D); and iron spearhead, arrowhead and nails.

A 10 to 15-cm thick deposit of ash, probably caused by a devastating fire, separated Sub-periods II A and B.

Period II B (thirteenth century to sixteenth century A.D.) witnessed a change in the settlement pattern around the Temple which is evident from the nature of the structures. A number of circular barns, having 1.6 m diameter with major part below the ground level, built of stones and paved with well-laid stone slabs, were raised over the ruins of the brick shrines. In the foundation trenches of these barns, ash was invariably used. Subsequently, these barns were covered with several courses of slabs, and for the first time the area was used for residential purposes.

Several sets of houses (pl. VI B) were exposed. The blocks were separated by 1 to 1.6 m wide narrow lanes. Each house comprised a series of independent rooms. A completely-exposed room measures 3.8 X 2.4 m. Each room was provided with a door-way (85 cm) opening mostly to the lane. A few rooms were interconnected. Generally, the living rooms were paved with stone slabs. Occasionally, the rooms were provided with drains paved and edged with stone slabs. In the open space in each complex, rectangular (1.8 X 0.8 m) open box-type of structure, built of monolithic slabs, were found. These structures were probably used as mangers. Unlike in the preceding period, the chief building material used was stone slabs of irregular size and width with slight dressing.

The pottery of this period consists of dull-black, grey, black-slipped, red-slipped and dull-red wares (fig. 4, nos. 12-14, 24-27, 23, 11 & 22). The grey ware is the most distinguished pottery of this Sub-period and is comparable to the grey ware from Period III of Satanikota and to the medieval period of Maski. Excepting a few handmade miniature pots the rest of the of this Sub-period is wheel-made pottery. Some decorated sherds (fig. 6, nos. 15-20) were also encountered in the red-slipped, black-slipped, dull-black and grey wares.

Among the copper coins recovered from the deposits of Period II B, a coin (weight: 1.74 gm) showing couchant humped bull facing left with a belt of jingles around the neck and representation of Sun and Moon above the hind portion of the bull on the obverse within a dotted circle, is noteworthy. On the reverse is a two line legend (with rule between the lines) in Nagari characters, reading *Deva-raya*. These type of coins were struck by the Vijayanagara king Devaraya I (A.D. 1406-1422), son of Harihara II (A.D. 1377-1404) of the Sangam dynasty. A few medieval copper coins were also recovered from the first two top layers.

Other noteworthy finds of this Sub-period include: beads of terracotta, shell, semiprecious stones and glass; bangles, both plain and decorated, of shell and glass; ear-ornaments of terracotta; rings of glass, shell, copper and iron; human and animal figurines of terracotta; iron nails, arrowheads; terracotta hopscotches, discs, tops; stone sculptural fragments and spindle-whorls; and copper bell and rods. A stone plaque, depicting standing female figures (pl. VII C) carved in low relief, was recovered from the surface, and is datable to sixteenth-seventeenth century A.D.

Bihar

4. EXCAVATION AT ANTICHAK, DISTRICT BHAGALPUR.—In continuation of the previous year's *(1977-78,* pp. 14-15) work, the Vikramshila Excavation Project of the Survey, under the supervision of Dr B. S. Verma, assisted by Sarvashri B. N. Prasad, S. K. Chaudhary, Vijay Shankar, A. Mukherji, T. K. Srivastava and M. P. Singh, resumed excavation in the area south-west of the main monastery and in front of the main gate.

Excavation in the area south-west of the monastery revealed a rectangular structure measuring approximately 41.5 m in length and 18·65 m in breadth. The thickness of the walls

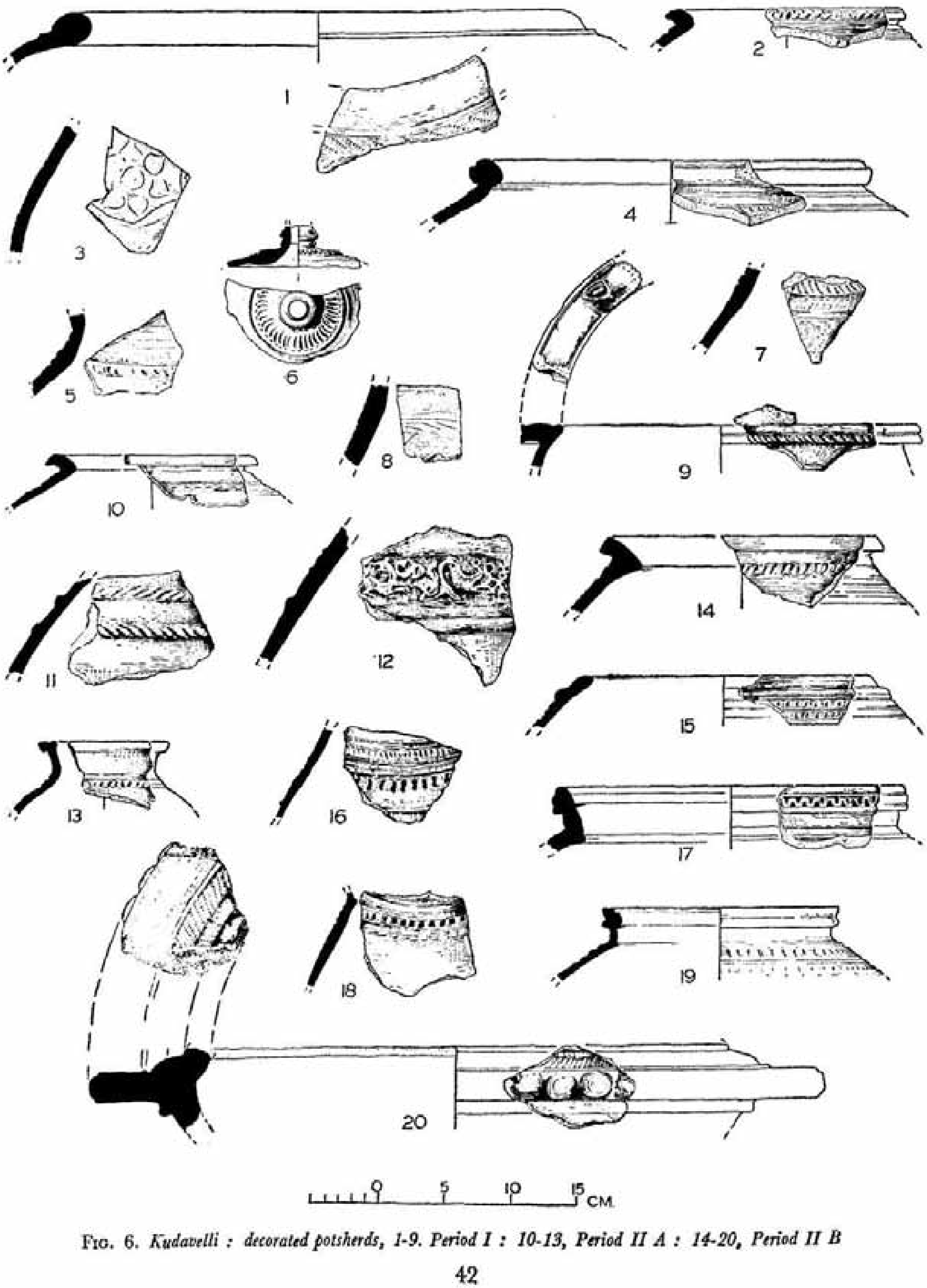


FIG. 6. *Kudavelli : decorated potsherds, 1-9. Period I : 10-13, Period II A : 14-20, Period II B*

on the north, west and east is nearly 1·9 m. However, the southern wall of the structure is abnormally thick (4.75 m) and is provided with thirteen sloping channel-like vents at regular intervals of 2.65 m, which merge with the water-level of a tank constructed just adjacent to the wall. This rectangular structure is connected with the main monastery by a narrow passage, the flanking walls (2.3 m in width) of which were traced to a length of 31.7 m standing to an extant height of fifteen courses of baked bricks at one place. The passage is 1.4 m in width and is paved with baked bricks. This structure contains four small cells of varying sizes and a rectangular bigger cell internally attached to the northern wall. Two more parallel walls of l.0 m thickness and running 2 m apart to a length of 37.8 m joining the eastern and western walls at one end were also exposed. It appears that this structure was used as the manuscript section of the *Mahavihara* because the vents in the southern wall seem to have been provided for the entry of cool breeze, essential for preserving the *talapatra* manuscripts, from the tank to the structure, the device being well known as forced draft ventilation.

The exposed tank, measuring 41 m feast-west) long and 33 m (north-south) wide, slopes towards south. Its floor is paved with bricks and plastered with lime. It is interesting to note that when the tank was fullv exposed, water started oozing out through the broken floor and within a short time the whole tank was filled up with water but after a week the water dried up automatically.

No antiquities worth mentioning were recovered from this area, except one almost complete sprinkler and a few fragments of the same type, besides a few bases of stone pillars. However, excavation on both sides of the passage referred to above yielded a series of medium-to small-sized votive stupas in rows (pl. IX A). Built of bricks as well as stone, these stupas are resting on a plastered floor. The height of the stupas vary between 30 cm and 1.6 m. At the base they vary between 50 cm and 3 m square. In almost all the cases, the top of the stupas are missing. More than fifty such stupas have so far been exposed.

Excavation in the area in front of the main gate of the *Mahavihara* yielded structures belonging to three phases. A few structures of late period have also been exposed, whose base is found paved with sculptured stone pieces robbed from the main monastery and bricks of the earlier structures. A pathway, paved with *lime-surkhi,* connecting the *Mahavihara* and the small gateway in the boundary wall exposed earlier, was also exposed. The boundary wall was found missing after 36 m towards west. On the east, it was found taking a turn towards south after 60 m.

Other finds recovered from the excavation include: terracotta figurines and plaques; stone images (pl. IX B) of Buddha, Vishnu, Kirtimukha, Surya, Siva, and Sadjyojata; beads ; copper coins, bangles, spouted vessel (pl. X A), bowls, etc.; panels of Buddha figures in limestone which were probably fitted to the circular drum (pl. X B) of the votive stupas; and other objects of iron, shell and ivory. Besides, a hoard of stone querns and pestles, totalling about fifty, in various stages of manufacture, was also recovered. Another interesting find is a triangular-shaped palette, carved with the figure of a bird.

Karnataka

5. EXCAVATION AT HAMPI, DISTRICT BELLARY.—In continuation of the previous year's *(1976-77,* p. 25) work, the Mid-southern Circle of the Survey and the Directorate of the Department of Archaeology and Museums, Karnataka, under the guidance of Shri V. Mishra, assisted by Sarvashri R. C. Agrawal, S. K. Joshi, C. B. Patil, S. N. Pawar of the Survey, and Dr M. S. Nagaraja Rao, assisted by Shri C. S. Patil of the State Department, resumed excavation at Hampi with the objectives of: (i) establishing the earliest cultural horizon of the site; (ii) tracing further details of the occupation of the Vijayanagara period; and (iii) imparting field training to students of the Karnataka and Mysore Universities. With these objectives

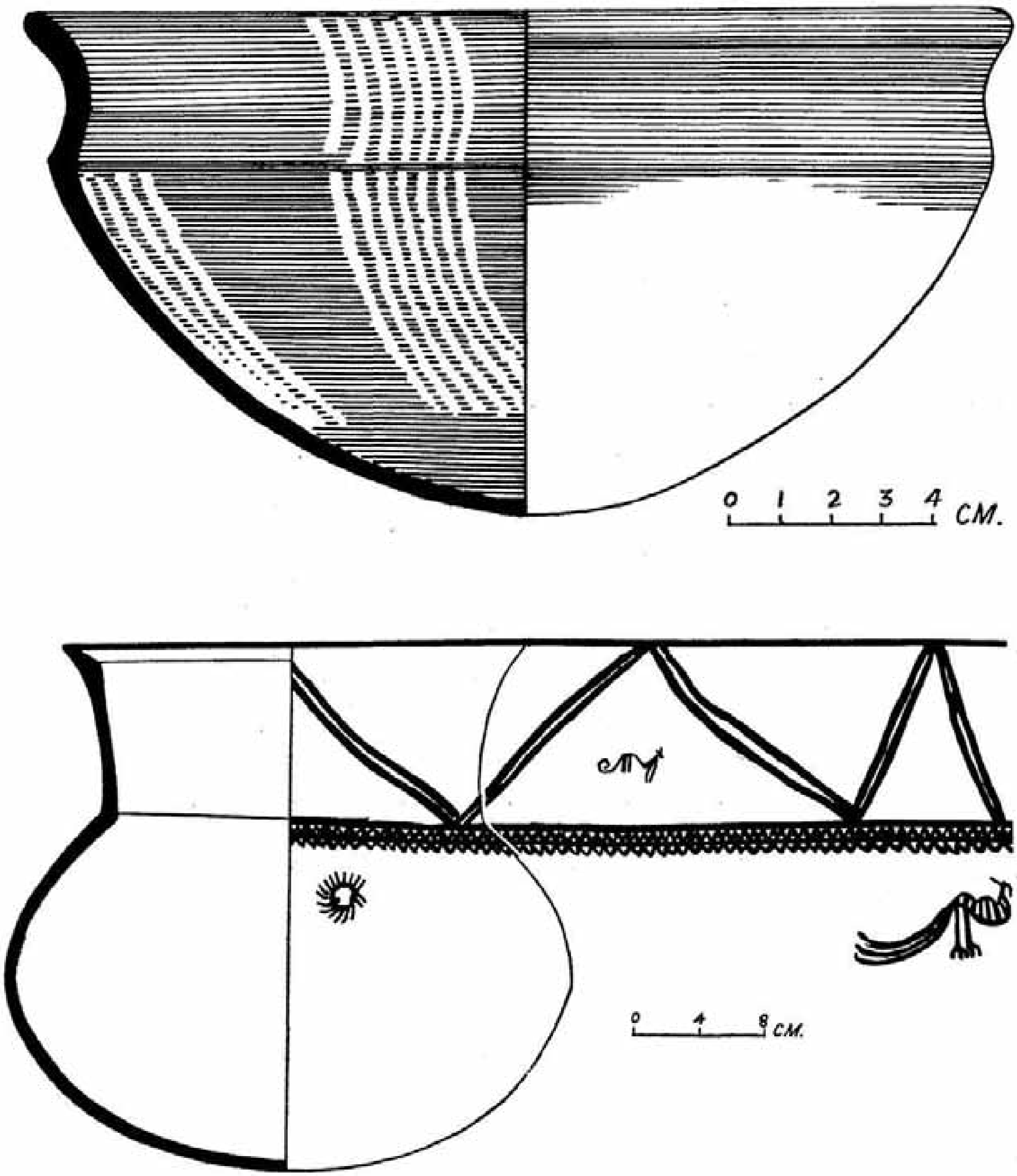


FIG. 7. *Black and red ware bowol with white paintiug from Tadakanahalli ; below, Black-painted Malwa ware*

in view, trenches were sunk in the Mint area in the northern portion by the Survey and in the southern and western parts by the State Department.

Excavation in the northern part of the area revealed only one structural phase of the Vijayanagara period in a basement with five receding platforms, of which the lowermost (20·85 X 9.30 m) is an addition on the east. Remaining four platforms (40.95 X 26·4 m) vary in height from one another by 70, 45 and 5 cm respectively. Each platform houses a component of the building-complex, such as verandah, courtyard, hall and rooms, the first-mentioned being on the lowest platform and the rest in ascending order on the east-west axis (pl. XI A-B).

The entrance leading to the verandah has a flight of steps with lion balustrades, flanked by platform of Cuddapah stones (pl. XII A). The courtyard is provided with raised corridor on three sides, and the eastern side shows two bases of pillars. A flight of steps leads to the rectangular hall from the western corridor. Eight rooms, arranged in three longitudinal rows, three each on the southern and northern wings and two in the centre, with two passages (2-m wide) in between the rows, are on the rear side of the hall. Among the rooms, the ones facing the hall are bigger and measure 4.2 X 3.9, 4.3 X 4.25 and 4.15 X 3.8 m respectively from north to south. Another room in the middle row is also bigger and measures 4.3 m sq. There is a short passage behind the middle row connecting the northern and southern wings with a gap between the two rooms of the same row. All the rooms are interconnected in addition to having their own entrances opening to the passage. Generally, plastered moulded pillar-bases and deep sockets were found at the entrances of the rooms. The walls of the verandah and courtyard are built of baked bricks and are well plastered. Besides, they are provided with niches having circular or semi-circular stucco pedestals for stucco figures (pls. XII B and XIII) in different poses as evidenced by the extant leg portions of the figures. The walls of the hall and rooms are of rubble covered by a coat of plaster. The flooring of the structure is neatly plastered. A flight of steps in the north-western side, probably leading to an upper chamber from the complex, was also encountered. On the main platform, traces of forty-three post-holes, filled up with ash, two stone pillar bases enclosed with bricks and traces of ten pillar bases all around the platform, were discovered. Besides, several pieces of wooden poles, some measuring more than 1.5 m, in length, were also noticed. This may suggest that the superstructure was of wood and was probably demolished by fire.

The exterior height of the main platform is 1.5 m. It was found that the platform is built over a lime plastered flooring (55 m sq) which is enclosed by a rubble masonry *prakara* wall running on three sides excluding the eastern side. Towards north-east of the complex, remains of a gateway built of stones and a monolithic trough (pl. XIV A) were unearthed.

It is probable that the above-mentioned building-complex was the Dancing Hall described by the Portuguese traveller Domingo Paes who visited the place in A.D. 1520.

The pottery collected from the site includes China Ware bearing Chinese script (pl. XIV B), male figures and floral designs, besides bowls, dishes, jars, basins, carinated *handis* and other domestic utensils in plain red and thick grey wares.

Noteworthy finds recovered from the excavation include: fragments of stucco figures including heads (pl. XIV C-D); copper coins, finials; iron objects like nails, daggers, swing-hooks, etc.; fragments of decorated stone pieces; badly burnt ivory finials; and a ring of gold. Excavation in the southern and western areas revealed remains of a building-complex measuring 30 X 22 m and having two halls and nine rooms, built on a stone platform, besides a massive stone wall. The area was found to be badly disturbed due to later vandalism.

6. EXCAVATION AT TADAKANAHALLI, DISTRICT DHARWAR.—The Department of Archaeology and Museums, Government of Karnataka, under the direction of Dr M. S. Nagaraja Rao, undertook excavation of four megalithic cairn-circles located about 2 km north of Tadakanahalli.

Megalith I was 9.5 m in diameter. After digging to a depth of 45 cm an almost circular pit dug into the quartz gravel layer in the centre was encountered. This central grave-pit was dug up to the uneven natural rock surface, over which was found well-arranged burial furniture including: bowls of Black-and-red Ware, some of which showing white painting (fig. 7, top), analogous to the ones from the overlap phase between chalcolithic and Early Iron Age at Hallur; conical lids, and lids of black as well as red ware; globular pots with four spouts (pl. XV A) and pots with four short legs of red ware; and iron implements including an arrowhead and a dagger (pl. XV B). These interments were found covered by a thick layer of clayey earth, over which skeletal remains such as skull and long bones belonging to two individuals were placed (pl. XVI A). The pit was filled up to the brim by clayey earth brought from elsewhere which contained small shells and molluscs. The whole pit was then provided with cairn packing of 45 cm thickness which was encircled by huge boulders.

Megaliths II, III and IV were found to be similar to the above-mentioned one in construction and in the placing of the interments, although they vary in dimensions and number of contents. Megalith II, 9.1 m in diameter, yielded thirty-four vases (pl. XVI B) and nine iron implements including heavy axe, arrowheads, spearheads and knives. Megalith III (pl. XVII A), 11.5 m in diameter, had thirty-six vases and six iron objects, while Megalith IV, 6 m in diameter, had twenty-seven pots and iron objects including two arrowheads, a dagger and a nail. Significantly, Megaliths II and III contained urn-burials (pl. XVII B), a feature common to the neolithic/chalcolithic culture of the region. The pottery, iron implements and the two urn-burials from these Megaliths indicate contemporaneity with the overlap phase between the chalcolithic and the Early Iron Age periods, dated to 1000 B.C. at Hallur.

Maharashtra

7. EXCAVATION AT DAIMABAD, DISTRICT AHMEDNAGAR.—In continuation of the last year's *(1977-78,* pp. 34-37) work, Shri S. A. Sali of the South-western Circle of the Survey, assisted by Sarvashri D. R. Patil, D. M. Kulkarni, G. L. Gaikwad, R. S. Trambake and R. D. Ingle, continued excavation at Daimabad, with a view to exposing house plans of Phase IV, Malwa Culture, in Sector II, besides obtaining more information regarding late Harappan (Phase II), Buff-and-cream Ware culture (Phase III) and Jorwe culture (Phase V). In addition, a small quantity of pottery belonging to Phase I (Savalda Culture) was recovered from the section scraping on the southern periphery of the site in Sector I. Noteworthy addition to the known painted designs of the Savalda Ware is a stylized human figure painted in ochre.

Excavation in the south-eastern corner of the Sector IV revealed a deposit of 45 cm belonging to Phase II (late Harappan), resting directly over the natural black cotton soil. The pottery recovered from this cutting showed the usual fabrics and shapes as found in earlier excavations, excepting two new forms: a bowl with incurved sides and a vase with a perforation in the centre of the base in burnished grey ware.

An important find of the season is a crescent-shaped potsherd, so shaped by carefully grinding the edges, bearing on one side a beautifully engraved scene of a tiger attacking a buffalo from behind and on the other a row of six lozenges with oblique lines inside the upper half of each lozenge as well as in the space between the lozenges in the lower portion. This is probably a cult object. Another small circular potsherd bears on both the sides a deeply engraved broad cross. Besides, triangular, sub-triangular, squarish, oval and circular potsherds, all of red ware, were also encountered.

Other noteworthy finds recovered from the excavation are: beads of jasper, chalcedony, including a double-horn type; terracotta horn of a bull (?) and a worn-out oval-shaped cake; and blades and fluted cores, chiefly of chalcedony.

Deposits of Phase III yielded pottery of usual fabrics and types encountered earlier, except for a fragment of a vase with narrow vertical rimless neck and globular body in buff and cream ware, painted in black, suggesting genetic relationship with the forms found in the succeeding Phase IV (Malwa culture).

An important discovery from the levels of this Phase is that of a pot-burial consisting of an oval-shaped vase with narrow mouth of burnished grey ware, covered with a lid kept inverted and a *kunda-type* vase with splayed sides and flattish base kept reclining against the oval-shaped vase by indenting the edge of the former to fit into, the peripheral portion of the inverted lid. The oval-shaped vase was found to contain ash and a few bits of bones, some of which being semi-charred and charred.

Phase IV is represented by a unique structural complex probably used for religious purpose. The complex (pl. XVIII A) consists of a mud-platform with a drain, six types of sacrificial altars and associated mud-wall houses. The platform, exposed to a length of 18 m oriented northwest-southeast, is enclosed by a series of post-holes along the margin. An apsidal dwarf mud-wall with a low mud-step flanked by post-holes at the entrance, a drain (3 m long and 50 cm broad) spilling to a soak-pit and a circular pit were found over the platform. The apsidal mud-wall was 5 to 10 cm high with plastered top and 20 an broad. At the rear of the apsidal structure (pl. XVIII B), in a circular mass of clay with raised sides abutting the inner face of the wall, was found embedded a stump of stone, rectangular in cross-section and coated with thick clay which was burnt red due to contact with fire in the adjoining small fire pit. The fire pit on the north of the stone stump, contained ash, pieces of charcoal and a third phalange of cattle. Another circular clay mass was noticed over the wall towards east of the above. It had three stones, one kept over two in a triangular formation, in the centre. A circular concave depression containing black clay was noticed on the south of the clay mass. To the west of this, partly on the wall and partly inside, was a circular mass of brownish clay used as a pot-rest as indicated by the fragments of a base of a vase of Malwa ware. Besides, nine more such depressions, probably pot-rests, a few of them with potsherds, were noticed inside the apsidal structure. A large number of pot-rests were found in the triangular area formed by the western wall of the apsidal structure, margin of the mud-platform and another altar consisting of clay rings. The altar with clay rings with a circular ash-pit (dia. 35 cm) in the centre, consisted of series of circular rings of clay, varying in width from 15 to 25 cm and in thickness from 3 to 5 cm with a diameter of 2.40 m. The area within the rings was found well plastered. A dwarf mud-wall, plastered all over, starting from the western post-hole flanking the entrance step of the apsidal structure terminating with a turn to the north at a post-hole, running parallel to the margin of the platform, was also encountered. Another altar, north-west of the above one, damaged due to later pit activity, measures 2"55 m east-west and 2.40 m north-south. This is a shallow pit with plastered floor. A rectangular (65 X 55 cm) pit containing ash and charred grains was noticed in the south-eastern portion of the altar. A post-hole and a fragment of a flattish stone were noticed by the side of the pit. The stone has a smooth surface on the underside, one of the sides and irregular upper surface having three depressions of 1 cm diameter and of equal depth. This stone was covered with patches of black soot and ash. In the north-eastern corner of the altar was found the base of a fragile reddish handmade jar containing ash and crushed pieces of jar and a post-hole. Remains of a mud-wall house (House no. 55), very much damaged by later pits, were noticed on the north of this altar.

Four pot-burials were encountered to the east of the above complex. Two of them were double-urn type (pl. XIX A) and the rest being single-urn type. The urns of the latter type were of black painted Malwa ware (fig. 7, below). One example of each of the two types lay within the ash-deposit of a U-shaped hearth.

A residential complex, House nos. 31, 32, 33 and 54, each having single room, situated closely to the north of the above religious complex, was exposed. Of these, House nos. 32, 33 and

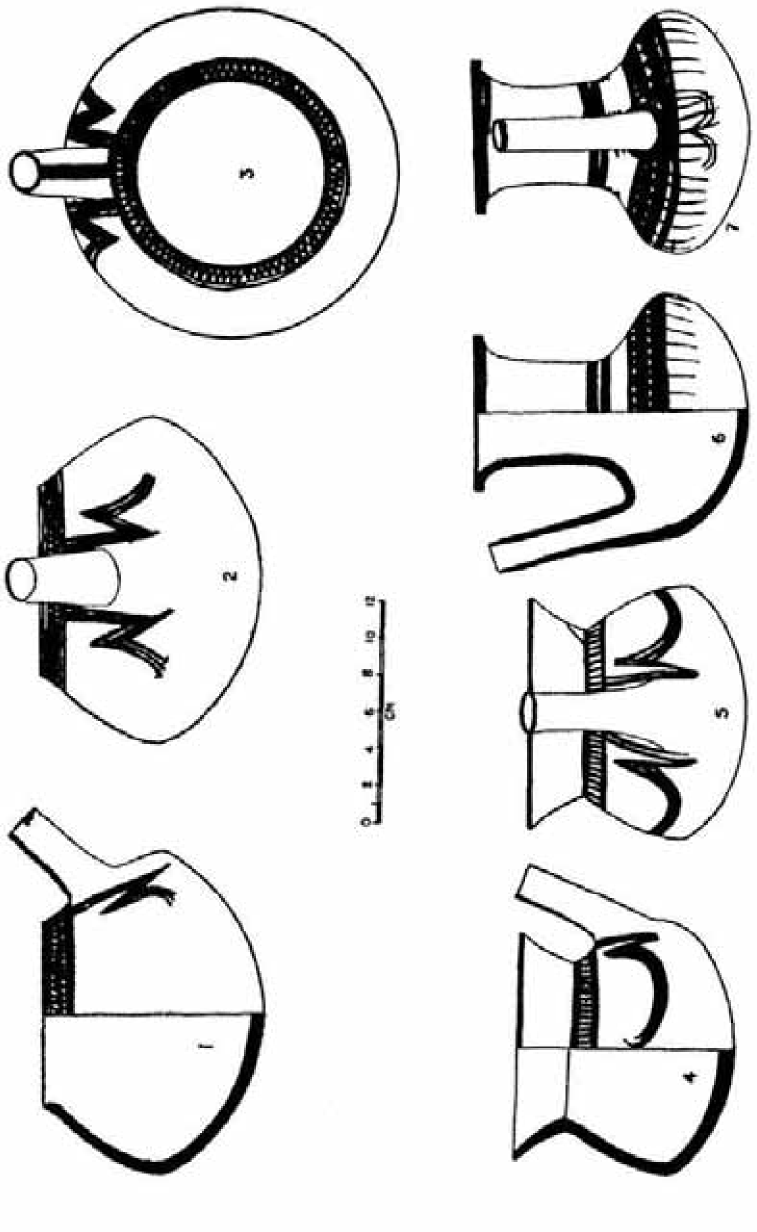


FIG. 8. *Daimabad : 1-5 spouted pots from Phase IV ; 6-7, Jorwe Ware from Phase V*

54 seem to belong to single house-complex as they are enclosed by walls running parallel on the north and south, whereas House no. 31 seems to be a separate structure being attached to this complex on the north. House no. 31, measuring 3'9 m east-west and 2"4 m north-south, had a 1-m wide entrance with a nicely plastered threshold of 3 cm height. The eastern and western walls were 15 cm thick whereas the northern was 10 cm thick. A circular hearth with a flat stone in the centre, was noticed in the centre of the room. By the side of this hearth, a 55-cm square compartment was exposed in the north-eastern corner of the room. Fragments of a jar of thick coarse ware were found lying by the side of this compartment. A circular pit (25 cm in diameter), filled with fine gravel, perhaps meant to be used as a pot-rest, was noticed in the north-western corner of the room. The floor of the room, though uneven, was well made.

The entrance for the large house-complex (House nos. 32, 33 and 54) was provided in the northern wall of House no. 32. The threshold of the entrance was 1 m long and 2 cm high, which lay close to the threshold of House no. 31. This large rectangular room (House no. 32) had a U-shaped *chullah* with a cusp in the inner side and 15-m broad mouth facing south-west. (Below this *chullah* lay four more *chullahs* of earlier sub-phases but the orientation of each one of them was different.) All the *chullahs* contained white ash. A heart-shaped sacrificial altar was found to the east of the *chullah*. The altar (1-8 m long and 1.3 m broad) had flat top gradually sloping in all directions. The sides varied in height from 2 cm (east) to 10 cm (west) from the floor level. A circular pit filled with whitish ash and with a stump of whitish hard clay (20 cm sq) in the middle, was found in the centre of the altar. Around this pit was a circular (70 cm diameter) clay-filling with occasional sub-angular small stones surrounded by ring of whitish clay and occasionally a few stones. Immediately to the east was an oval-shaped sacrificial altar, measuring 1.4 m in length, 85 cm in breadth and 5 cm in depth, with well plastered sides and floor. It was found filled with ash, charcoal bits, semi-charred bone pieces and a few potsherds.

House no. 54, a rectangular room measuring 3.8 m (north-south) X 2.3 m (east-west), having entrance on the west with a step measuring 1 m long and 40 cm wide, which was further east of the above-mentioned altar, had narrow lanes (40 cm wide) on southern and northern sides. The room was found partitioned by a 70-cm long wall. The sunken floor of the house had been disturbed in the western corner by a later pit. The entrance, provided on the east at south-eastern corner, had a semi-circular (95 cm long and 40 cm broad) step of hard clay, probably representing a prototype of *chandrasila.* An oval-shaped sacrificial altar (95 X 75 cm) with curved sides was encountered immediately to the north of the step, adjoining the eastern wall. A circular (35 cm diameter) pit, filled with ash, potsherds and bits of bone, was located near the altar.

House no. 33 was again a large rectangular (3.7 X 2.5 m) room, running parallel to but separated by a 10-cm wide mud-wall of House no. 32. It had three entrances, one with a 3-cm high threshold on the north facing House no. 32, another (60 cm wide) on the south, opening into the area between the U-shaped hearth and the apsidal structure on the mud-platform, referred to above, and the third with a neatly plastered threshold, measuring 1.4 X M X 0.05 m, on the east. A platform (1.05 X 0.95 X 0.05 m) was found near the eastern entrance of the house. This platform had a post-hole and a 15-cm thick wall of wattle and daub which was connected with the southern wall of the earlier mentioned big house-complex. The 10-cm thick western wall of the house was running along the edge of the sacrificial altar with mud-rings. The wall showed three post-holes. A circular pedestal (clay stump), 20 cm in diameter and 15 cm in height, was exposed inside the room, close to the western wall. This pedestal, made of hard whitish clay was probably meant for the wooden pot to rest. Near this pedestal a circular area (15 cm diameter) was found with potsherds embedded in the floor (pl. XIX B). The floor of the house was partly made of earth mixed with fine gravel.

House no. 30, a structure with two rooms, located towards north of House no. 31 and separated by a narrow (20 cm) lane, was found disturbed by pit on the north. The extant portion, however, measured 4·6 (east-west) X 3·6 m (north-south). The eastern room showed a circular hearth, a circular (30 cm in diameter) patch of floor decorated with potsherds of Malwa ware fixed vertically and a U-shaped *chullah.* Post-holes were observed on all the corners of the house and occasionally in the walls. Entrance was also flanked by post-holes. In all the exposed houses, a set pattern of floor-making was observed. Thick layer (1.5 cm) of fine sand and silt was first rammed over the old floor. It was then covered by a 5-cm thick rammed layer of silt and clay, which in turn was plastered with a thin coat of mud-paste. The flooring was seasonally coated with such mud-plaster as evident from the exposed floor of House no. 30 which had six such coats.

The burials encountered in this Phase were of double-urn and single-urn type. One of the burials (no. 41) of the former type had two urns of different wares, viz. the northern one of burnished grey ware and the southern one of the Malwa Ware (fig. 8). The latter urn with globular body and slightly out-curved high neck had painted designs consisting of rim-band, pairs of opposing oblique lines between the rim-band and the neck-band, a dog, wavy horizontal line between horizontal bands and sun and peacock motifs. Beads of carnelian, bone, pieces of skull and a few teeth were found in the northern urn.

Among the other objects recovered from the deposits of this Phase, mention may be made of: a human figure in applique on a potsherd of handmade thick coarse ware; copper objects such as pieces of a bangle, a chisel and a small sheet; beads of carnelian and terracotta; points and beads of bone; a segmented and other beads of faience (?); and stone blades.

Phase V is broadly represented by two types of structures, religious and residential, belonging to four structural phases, labelled 1 to 4. House nos. 34 and 35, a crescent-shaped structure and a pit represent the religious structures. House no. 34 was an apsidal mud-wall structure (10 cm broad and 5 cm high) probably a sacrificial temple. It was found very much damaged by later pits. The structure, oriented east-west, internally measured 5 m (centre-to-centre) in length and probably 2.7 m in width at the entrance. A large circular pit including a shallow circular fire-pit damaged by later pits, was found inside the structure (pl. XX). Thirty sub-angular stones showing signs of burning and a bone of third phalange of cattle were recovered from the circular fire-pit. A deep bowl of ill-fired, redish gritty ware, containing black clay, was found embedded into the floor near the fire-pit. The wall of the structure was well plastered.

House no. 35, (measuring 5.3 m (east-west) and 1.0 m (north-south) is adjacent to the above one with a gap between the two. The walls (20 cm broad and 5 cm high) of this structure and the gaps are also well plastered. The structure was provided with entrance on the north. The extant patches of floor show that it was very neatly plastered.

The crescent-shaped mud-structure was situated south of the apsidal structure and House no. 34. It consisted of three parts: (i) a central platform of rammed hard of whitish earth, measuring 3 cm in height and varying in width from 1.3 to 2 m; (ii) a 25-cm wide mud-wall of light brown earth running along the inner margin of the central platform; and (iii) a 30-cm wide mud-wall of light brown earth running along the outer margin of the central platform. Both the ends of this structure and inner space were not completely exposed. However, along the outer margin of the structure, one circular pit with 50 cm diameter and another oval-shaped pit (80 X 50 cm), both containing ash and charred animal bones, and post-holes were noticed.

The pit referred to above in House nos. 34 and 35 was an ash-pit, probably connected with religious functions, particularly relating to children. The pit, measuring 2.8 m in diameter and 45 cm in depth and lines with a 25-cm thick wall, yielded ash, a large number of charred and semi-charred animal bones, potsherds of Jorwe ware, burnished grey ware, thick coarse ware, besides pieces of fragile ill-fired coarse handmade light ware, fresh-water shells, small stone

balls, blades of chalcedony, a couple of terracotta mother goddesses and a terracotta gamesman-like object.

The above-mentioned religious structures besides two more partly exposed houses (nos. 28 and 29) belonged to the first structural phase. Among the two houses, House no. 28 yielded two disturbed burials below the flooring.

House no. 38, the largest of all structures of the Jorwe Culture so far exposed, belonged to the second structural phase. Initially, the house (9 X 5 m), built of mud-walls of light brown colour, varying in thickness from 25 to 30 cm, was oriented northwest-southeast. The floor of the house was originally made in three layers, 2-cm thick brown clay covered by an equally thick layer of yellowish silt with *kankar* pellets, the surface of the latter being well plastered. Five such floor-levels were observed in this house but the second one from the bottom is well preserved. During the second floor level the size of the house was reduced. The mud-walls were replaced by the wattle and daub walls with wooden posts at regular intervals. Two entrances, one from the north and the other from the west, were provided, instead of only one from the north during the first floor level phase. The house yielded a circular hearth containing white ash, a *kunda-type* vase of burnished grey ware, a small flat stone and a terracotta cylindrical seal (fig. 9). The size of this house became further reduced during the upper three

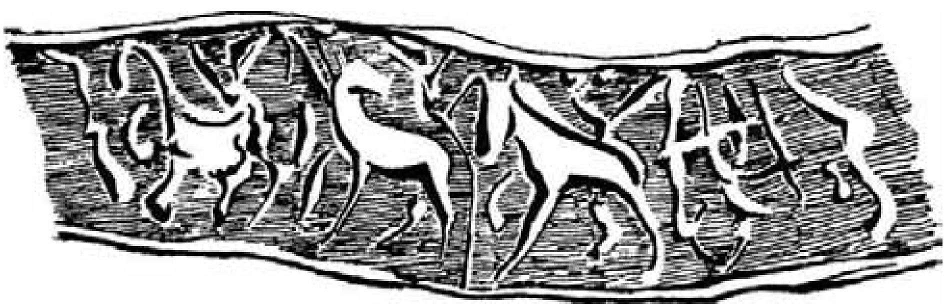


FIG. 9.

floor levels so much so that during the topmost floor level, the house measured 5 x 3 m. Besides, the orientation was also changed to east-west. The fifth and the last floor level is coeval with the third structural phase of the Culture. The walls of the houses of this phase were made of mud, as was evident from the thick layer of debris consisting of mud-wall fragments lying over this floor level. A unique terracotta figure was found in the debris.

Seven houses (nos. 57 to 63) represented the third structural phase. Most of the houses were severely damaged. The houses were separated by lanes ranging in width from 60 cm to 1*2 m. All the houses are oriented east-west, except House no. 62, which was oriented northwest-southeast. Five urn-burials (nos. 34-38) were found cut through the flooring of this house.

The fourth structural phase is marked by circular houses or huts (nos. 39 to 42 A and 43 to 49) including an example of a twin hut (nos. 42 and 42 A), a road and a lane. The smallest among the huts was 1.6 m in diameter and the largest 4.5 m. Some of the houses showed pot-rests, square or circular raised platform plastered with mud. some with stones embedded in it. Interestingly enough, none of the houses had hearths but had ash patches on the floor. Two double-urn burials were found in House no. 48. In the same house were found four stones with flat top kept apparently for resting a four-legged jar. These circular huts lay on either side of a road, 1.4 m broad, running east-west for 12 m and then taking a turn towards north. House nos. 39 and 40 were on the northern side and the remaining on the southern. The road was made

of compact yellowish clayey earth embedded with stones and potsherds. The courtyard in front of the huts were plastered up to the edge of the road. Some of the courtyards had post-holes running parallel to road perhaps for erecting sheds. A lane, 70 cm broad, made of yellowish clayey earth, was found running by the western side of House no. 43 and between the twin house on the west and House nos. 44 and 45 on the east. It terminated at the front courtyard of House nos. 44 and 45.

An important discovery of the season was a massive wall made of whitish and yellowish hard earth with circular and semi-circular earth masses resembling bastions, exposed to a length of 36 m, varying in width from 3 to 5 m. This was probably a fortification-wall belonging to the topmost level in Sector I.

The burials encountered during this season's work in the Jorwe levels were of usual double-urn type showing no special feature worth special mention. One solitary example of extended inhumation type was also recorded. This extended burial, found in the eastern courtyard of House no. 38, belonged to a boy of about 10-12 years of age. The skeleton lay north-south, the head being on the north and slightly tilted towards the west. On either side of the head was placed one carinated bowl of Jorwe ware and a cup of burnished grey ware with splayed out sides and flat base. The cup showed a patch of black soot inside. One fresh water shell was found kept near the left hand below the carinated bowl.

Important finds recovered from the Jorwe levels include: a terracotta objects such as a cylindrical seal, figurine of deified sage with three consorts, mother goddesses, gamesman, skin-rubber, dabber, toy-cart wheel, painted balls; pottery comb; a massive and large polished stone axe, stone balls one of them with blind hole on either side; bone points; copper bangles; and beads of terracotta, carnelian and shells. The cylindrical seal bears a scene of a procession passing through a jungle. This is roughly divisible into three parts. The scene shows a horse driving a cart behind which is a snake-like representation. A tree is shown in front of the horse. A deer is majestically looking back near the tree. Another tree is in front of the deer. A camel-like long necked animal is standing near the tree. The terracotta figurine of a deified sage with his three consorts is a unique piece. It was found in the debris of mud-walls of the fifth floor level of House no. 38. It has a coating of ochre and probably represents an object of worship.

8. EXCAVATION AT INAMGAON, DISTRICT PUNE.—In continuation of the last year's *(1977-78,* pp. 40-41) work, Drs Z. D. Ansari and M. K. Dhavalikar of the Deccan College and Postgraduate Research Institute, Pune, assisted by Kumari Shubha Khandekar and Sarvashri Y. S. Rasar, Vishwasrao and V. K. Nagpure, resumed the excavation with a view to exposing the overlapping phase between the Malwa (Period I) and the Early Jorwe (Period II) Cultures. The evidence unearthed is extremely interesting inasmuch as it suggests that many of the cultural elements of the Jorwe such as house plans, pottery and cultural equipment were found to have been borrowed from the Malwa Culture. It is now clear that even during the Malwa Period *(circa* sixteen hundred-fourteen hundred B.C.) Inamgaon was a very prosperous settlement.

All the twelve houses exposed this season, except one, belong to the transition phase between the Malwa and the Jorwe Cultures. They were spacious structures with longer axis oriented east-west, and lanes in between. A road, probably 1-m wide, running north-south was also exposed. The houses were considerably long, the length being almost double the width. They were divided into two parts by a partition wall, traces of which have been found in almost every house. The courtyards had well-rammed floors. However, the floors of the houses do not seem to have been plastered with cow-dung as was the case in the succeeding period. They were probably lined with clay and that too not frequently but after prolonged intervals.

Usually, a set of four flat stones or clay roundels for supporting four-legged storage jars were found on the floor of the houses. The jars with flat-bottoms were supported by circular

clay stands made *in situ*. Besides, there were pit-silos and circular mud-platforms for supporting storage bins.

Another interesting feature of this Phase is the fire-pits, both inside the house and outside. They are usually oblong on plan with one side straight and the other curved. The fire-pit inside the house probably had mud-walls except at the opening, obviously to confine the fire inside the pit. Fire-pits outside the house do not seem to have had such high walls.

A small pottery kiln (7.6 X 4.75 m) was found in the eastern half of a house no. 85 (pl. XXI A). The pit is circular on plan (1.55 m diameter) and is 51 cm deep. Its fire-chamber at the base is 1·86 m long and 57 cm wide (pl. XXI B). The sides and the base of the kiln are fired hard by constant use. It is exactly similar to that found earlier in deposits of Period II. Incidentally, it may be stated that this house also yielded a number of bone points and a knife.

The overlapping phase yielded evidence indicating transition in pottery as well. The spouted jar with flaring mouth and the concave-sided bowl which are so characteristic of the Jorwe Ware appear to have been directly borrowed from the Malwa Culture (pl. XXII A). The carination on the Malwa bowl is rather blunt but becomes sharp in the Jorwe level. Besides, there are a number of potsherds belonging to this Phase which are on the transitional stage between the Malwa and Jorwe. Another interesting example is that of a grey ware incense burner. It is squarish in form and has projecting corners and incurved side and a short ring-base. In the succeeding period this becomes a rectangular recepticle.

Of the eighteen burials encountered this season, nine belong to the overlapping Phase between Periods I and II. Among these, there was not a single example of an extended burial. All the burials except one were of the twin-urn type in which two grey ware urns were placed horizontally mouth-to-mouth in a burial pit oriented north-south. They contained mortal remains of children. Generally, food and water were also deposited in the pit in a painted bowl and a spouted jar. In one case the burial pit did not contain burial-urns but instead had three painted vessels of which two were of Malwa fabric (a spouted jar and carinated bowl) and one of the Jorwe fabric (spouted jar). There were no skeletal remains and hence, can be identified as a symbolic burial. Again, one of the two grey ware urns was replaced by a painted Malwa jar. Of the other burials belonging to Period II, the most interesting was one which contained three skeletons of children in a circular pit (pl. XXII B).

The tool-kit of the people was of copper and stone objects. They also used beads of semi-precious stones. A few baked and unbaked examples of female figurines were also found which probably represent the cult of mother goddess. Besides, two male clay figurines, represented nude, were also recovered from this overlapping phase which can be dated to *circa* fifteen hundred B.C.

Uttar Pradesh

9. EXCAVATION AT FATEHPUR SIKRI, DISTRICT AGRA.—In continuation of the last year's *(1977-78,* p. 51) work, excavation was resumed under the joint collaboration of the Survey and the Aligarh Muslim University. The work was directed by Shri W. H. Siddiqi, assisted by Sarvashri K. P. Poonacha, S. K. Lekhwani, Y. K. Sharma, S. K. Jain, B. D. Jain, B. B. Sur, Chiranji Lai and Shri H. K. Kathpal of the Survey and Professor R. C. Gaur, assisted by Sarvashri Jamal Mohammad Siddiqi, K. K. Mohammad, Dr Q. S. Usmani and Mohammad Anis Alvi of the University.

Excavation in an area of 13,800 sq. m east, south and west of the area excavated last season, revealed three huge secular structures belonging to the Mughal period. The walls of the structures were built of dressed sandstone rubble, plastered with lime on either side. The floor of all the rooms were also plastered. In all, twenty-eight rooms, variously used as private rooms, sitting rooms and store-rooms, were exposed. The kitchen is conspicuous by its absence

in all the three complexes. The rooms are mostly rectangular on plan and varied in size, the largest being 7.8 X 5.6 m while the smallest being 3.7 X 1.4 m. Of toe three structures exposed, the structures on the east and west had an extensive courtyard surrounded by rooms on all the four sides. The courtyard of the eastern structure was probably paved with rectangular sandstone slabs.

Structure I, exposed on the western side of the area excavated last year, had a portico, square on plan, built of dressed stones with a series of offsets at its corners and two entrances one each at the north and west. The western entrance was flanked by small raised platforms of of 66 cm height. These platforms are later additions, as they are constructed right over the *dasa* stone of the first level. At the southern side of the portico, a set of two rooms, rectangular on plan measuring 6.6 X 4.3 and 6.3 X 4·3 m, fronted by verandah facing east, were exposed. A *pranala* plastered with lime-mixed *kankar* was noticed in the exterior of the eastern wall. This was probably meant to drain out the rain water from the terrace. The roof of the verandah seems to have had a sloping shape covered with tiles as evidenced by the occurrence of a number of broken tiles during the excavation. A *hammam,* consisting of five rooms and a toilet with a small partitioned area perhaps used as urinal, adjoining the above-mentioned rooms, was also unearthed. A partition wall of dry stone masonry built over the lime-plastered floor in one of the eastern rooms of the *hammam* was noticed. Evidently, this wall is of later times and suggests subsequent occupation of the structure after it was abandoned. In another room a raised platform paved with dressed red sandstone slabs, probably used as dressing room, was noticed. A drain of 5 cm width was found cut into the stone slabs, running along the southern and eastern walls of the room and through the passage leading to the toilet. Another rectangular room, the largest (8·35 X 3.10 m) in the *hammam,* facing north, had five offsets on the eastern and western sides of the wall. There were two deep masonry built cisterns, evidently used to contain hot and cold water for bath. The floor of the room was bordered with rectangular slabs of red sandstone over which was provided a fine thin layer of lime decorated with paintings in black representing geometrical designs. The remaining portion of the floor is made of lime-mixed *kankar.* The toilet attached to the *hammam* was provided with two seats and a partitioned space at its rear for urinal. A small niche was provided in the eastern wall to the south of the toilet for keeping the water pot for use in the toilet. The waste water was drained through an underground drain.

Both the portico and *hammam* seem to be part of a dilapidated structure standing at the western side of the area under excavation. The lull picture of the complex can be obtained only when the remaining area is excavated.

Structure 2, oriented east-west, is a huge rectangular structure with six rooms in a series on the eastern side of the *hammam.* The rooms are interconnected. They face north and are provided with entrances on all the four sides. The rooms on the eastern and western ends of the complex are comparatively larger in size. The western extreme room had two cells at the western corner, of which the one at the north-western end was semi-circular on plan with a 5-cm thick lime floor, probably used as store-room. The rooms were covered by domed roofs which is evident, from the unearthed architectural members and bricks and substantiated by the presence of piers provided at regular intervals in the room. The rooms on the northern side were provided with a front verandah covered with tiled sloping roof. The stone slabs kept at the edge of the verandah were provided with sockets to fix slender supporting pillars to carry the load of the roof. The drain was covered with red sandstone *jalis,* as is evident from the one encountered *in situ* at the eastern extreme end of the back wall of the complex facing north. Surprisingly, no roof was provided to cover the backyard. The front verandah and the backyard were flanked by two galleries, each on western and eastern sides. The eastern gallery was wider than the one on the west. A small room, measuring 2.4 X 1.4 m, with slightly raised platform with a step was

noticed in the south-eastern corner of the complex and was probably used by the servants attending their masters. An underground vault under this room used for storing pots was also unearthed. The courtyard in front of this complex was rectangular on plan and measured 34.8 X 1.4 m.

Structure 3, exposed while digging at the eastern and southern sides of a big room encountered in the last season, was a big house-complex with a stone paved courtyard surrounded by a series of rooms on north, east and west (pl. XXIII). In the south-eastern corner was a big *hammam* and at the south-western corner a huge toilet-complex. The complex had two entrances, one on the south and the other on the east. In front of the largest room of the complex facing south exposed in the last season, a verandah measuring 12.3 X 4.5 m was unearthed. This was probably covered with a flat roof, evidenced by the pilasters provided in the eastern wall which carried the load of the flat roof. Adjoining the above room on the east was noticed a set of two rooms facing south, rectangular on plan, interconnected by a doorway. A toilet with three seats and a small circular raised platform with a decorated pedestal to keep the water pot were connected to the above room. A small tank, sunk into the floor near the entrance of the toilet, was probably meant to store the waste water which was removed by manual labour. The seats of the toilet were of sandstone slabs unlike the ones in the toilet of Structure 1 which were of bricks plastered with lime. The toilet had two entrances, one on the south and the other on the west, the latter connecting the adjoining room. Attached toilet system seems to be a notable feature of the houses of the Mughal noblemen. The western wing of the complex consisted of five rooms facing east with a verandah measuring 16.3 X 3.5 m. In one of the rooms, a raised platform was provided. The walls of the rooms were provided with a number of niches probably to keep things of daily use including books. In one of the rooms three big storage jars buried up to the neck were found. These were probably used to store wine or grains. A small square marble slab with an iron ring on the top was also encountered. In front of the above rooms huge brick pillars built at regular intervals were noticed accommodating arched entrances of the verandah with a flat roof. The southern wing consisted of two simple rooms and the eastern of five rooms facing west, the latter being built at a higher level. The rooms facing west were provided with a small platform built of masonry over the already existing stone paved floor. The room facing south was provided with a raised platform, measuring 7·6 X 3.9 m. The central courtyard had a raised platform probably used for prayer by the elders of the family. The width of the platform was 6.6 m, the length remaining unascertained due to disturbance. At the south-western corner of the complex, a huge toilet measuring 7.5 X 7.1 m with forty-two seats and with entrance at the south-eastern corner was exposed. The seats were made of big slabs of sandstone resting on small lime platforms. A narrow drain (10-15 cm wide) plastered with lime was provided in front of the seats. This drain was found connected to an underground drain covered with slabs of sandstone. The entire room was paved with rectangular slabs of sandstone. The very purpose of providing so many seats in a single toilet indicates the number of persons in the family and the sense of hygiene. Another toilet in the south-eastern corner and to the west of the existing *hammam* was provided with seven seats with a drain sloping towards south-west and a small raised platform with a stone slab at its top. The entrance of this toilet was connected to the nearby *hammam.* Originally, the walls of the *hammam* were profusely decorated with coloured square tiles to a height of 1 m from the floor level. This evidence further corroborates that the whole complex had been occupied by a wealthy group of people, most probably the nobles.

The above-mentioned structures were built of sandstone rubble plastered with lime over the layer of mud. The thickness of the plaster varies from 3 to 11 cm. At some places it was noticed that the bricks were kept vertically in between the layers of lime plaster to strengthen the plaster as well as to increase the thickness. The occurrence of pieces of mother of pearl cut into geometrical designs and mica which were used for decoration were also encountered.

Pottery recovered during the excavation included red ware, glazed ware, Chinese porcelain and the typical Mughal de luxe ware showing decorations. Some of the sherds of the Chinese porcelain bear Chinese script on the base and showed designs representing mystic animals, landscapes, fish, etc. Sherds of the decorated ware bear fragmentary inscription in Arabic characters. A large number of glass objects including portions of high necked jars or *surahi* and bangles of various colours were also encountered. Other antiquities recovered include: terracotta animal figurines; copper coins and other objects; and iron objects such as nails, battle-axe, hammer, arrowheads, fish-hooks, etc.

10. EXCAVATION AT BHARDWAJ ASHRAM, DISTRICT ALLAHABAD.—In continuation of the previous year's work, the Indian Institute of Advanced Study, Simla, and Excavations Branch (II) of the Survey, resumed excavation at Bhardwaj Ashram, under the project, Archaeology of Ramayana Sites. The excavation was jointly directed by Professor B. B. Lai of the Institute and Shri K. N. Dikshit of the Survey, assisted by Sarvashri B. R. Meena and J. C. Dey of the Survey. Altogether three trenches were sunk: one (ALB-3) outside the Bhardwaj Municipal Garden, close to the Bhardwaj temple known as Beni-Madhava temple, the second one (ALB-4) opposite the garden and by the side of *akhada* (wrestling arena) and the third (ALB-5) just near the road leading to the Bhardwaj temple.

Excavation in ALB-3 revealed the occupation of two widely-separated periods. A deposit of sandy loam with an average thickness of about 1.5 m, overlying the *kankary* natural clay, yielded sherds of black-slipped, grey wares, Northern Polished Ware and associated red ware. The number of grey ware sherds obtained from the trench was very few. Among the sherds of the black-slipped ware some examples showed flaking off portions of the slip, exposing the grey colour of the body-fabric. It may be mentioned here that this phenomenon was also noticed at Sringaverpur and Pariar. A few charcoal bits and lumps of clay with reed-impressions were recovered from this level. The picture thus presented was that of a casual habitation in this area.

It appears that the locale was the ancient bank of the river Ganga, which is suggested by the sudden fall of the contour, hardly a 100-m away. This would also explain both the nature of the aforesaid deposit as well as its sloping behavior. Within the natural clay underneath, the calcareous nodules noticed at the lower level were larger in size than those in the upper levels.

After a very long gap the site was occupied during the Gupta period, as evidenced by typical terracotta figurines (pl. XXIV A-B) and pottery. The structural activity of the period was represented by a floor paved with baked bricks, the average size of the bricks being 39 X 25 X 7 cm.

11. EXCAVATION AT CHOPANI-MANDO, DISTRICT ALLAHABAD.—In continuation of the last year's *(1977-78,* pp. 51-52) work, the Department of Ancient History, Culture and Archaeology, University of Allahabad, resumed excavation under the direction of Sarvashri B. B. Misra and Bal Gopal Pandey working under the general supervision of Professor G. R. Sharma, with a view to exposing horizontally the settlement of the last phase of the occupation. In all, eight hutments, oval or circular in shape and ranging in diameter from 5.4 to 3-4 m, were exposed (pl. XXV A). Objects (pl. XXV B) like anvils, mullers, hammerstones, ringstones, microliths and handmade pottery, represented by ill-fired, ochrous red ware and impressed or moulded ware were obtained from the floors of these hutments. One of the anvils showed three tiny pits in one line suggesting that some hard material, possibly connected with food was processed. The giant anvils with smooth surface and marked concavity were also used for grinding purposes. Similarly, the cylindrical hammerstones seem to have been used as pestles or rubber stones. On two southern edges of an anvil were found two pieces of ochre. The microliths

obtained from the excavation include cores, flakes, blades, blunted backed blades, pen-knife blades, serrated blades or saw points, lunates, scrapers, borers, arrowheads, triangles, trapezes and trapezoids, mostly fashioned on cherty material. The presence of large number of anvils, hammer stones, raw material and microliths in different stages of manufacture throw welcome light on the tool technology of the period. Three circular hearths, ranging from 1 to O9 m in diameter were also exposed. These hearths contained loose ashy deposit full of small fragments of animal bones, bits of charcoal and small stone pieces and occasionally a few microliths.

12. EXCAVATION AT MAHAGARA, DISTRICT ALLAHABAD.—In continuation of the last year's *(1977-78,* pp. 52-54) work, the Department of Ancient History, Culture and Archaeology, University of Allahabad, resumed excavation at Mahagara under the direction of Sarvashri D. Mandal and Kamalakar Thakur, working under the general supervision of Professor G. R. Sharma, with a view to demarcating the northern boundary of the neolithic settlement.

Excavation revealed that the northern boundary of the settlement was extended up to the slope of the northern ridge located earlier in the area. In this season's work, only the last phase of the neolithic settlement was exposed. Traces of hutments and refuge pits were brought to light. Pottery represented by corded, rusticated and burnished wares, besides rounded celts, microliths and animal bones were obtained from the floor levels of the huts.

13. EXCAVATION AT SRINGAVERPUR, DISTRICT ALLAHABAD.—In continuation of the previous year's *(1977-78,* pp. 54-56) work, Excavations Branch (II) of the Survey in collaboration with the Indian Institute of Advanced Study, Simla, resumed excavation at Sringaverpur, under the project, Archaeology of the Ramayana Sites. The work was directed jointly by Professor B. B. Lai and Shri K. N. Dikshit, assisted by Shri D. K. Sinha. The principal objec tives of this season's excavation were: (i) to ascertain the existence of an independent horizon of the red ware industry found in the earliest levels last year; and (ii) to tracing the plan of the massive baked-brick wall encountered last year in the low-lying area to the north of the high mound (SVP-1).

Excavation in SVP-1 confirmed the existence of seperate horizon of the red ware industry represented by a 30-60 cm thick occupational deposit of compact yellowish clay. The pottery may be broadly classified into two categories, one made of well levigated clay, nicely potted and well fired, and the other having a coarser texture somewhat indifferently potted and also insufficiently fired. There is occasional use of slip in both the varieties. A few specimens in the former ware have been found to bear painted designs such as simple lines or hatched diamonds in black pigment. A few sherds with horizontally raised bands and shallow incised designs including comb-like pattern, parallel lines, etc., were also found. The types include: jars with prominently out-turned rim, bowls with featureless or everted rim, shallow basins with horizontally splayed out rim, vases with disc-base and platters. Some of the fragments are suggestive of types like dish-on-stand (?) with drooping rim and bowl or basin with channel or tubular spout and/or loop-handles. There are a few specimens of lid either with central depression made by fingers or with a curved knob. While it remains to be seen as to how far this ware compares with the Ochre-coloured ware, it seems to have no typological connection with the red ware reported from Kakoria in this region. Remnants of burnt earth with reed impressions, possibly parts of huts, were also noticed. Other antiquities recovered include: pottery discs, with or without a central perforation and a small fragment of a flake of carnelian. This settlement may be dated to the second half of the second millennium B.C.

Period II (Pre-Northern Black Polished Ware) is represented by black-and-red, black-slipped, burnished grey and associated wares. The thickness of the occupational deposit is nearly 1.35 m. However, the earliest layer of the deposit showed an admixture of

Ochre-coloured ware and the regular wares of the Period, which may be due to the churning up of the then land-surface by the succeeding occupants. No such admixture was noticed in the subsequent layers which yielded ceramic industry of the Period II. The number of burnished grey ware sherds, however, was very limited. In a few cases, the slip on the black-slipped sherds had flaked off completely or partially, thereby giving an impression that they belong to the plain grey ware fabric. Similar phenomenon was observed in the black-slipped and Northern Black Polished Ware sherds found at Bhardwaj Ashram, Allahabad and at Pariar. Among the antiquities of this Period, mention may be made of points, pendant and barbed arrowhead of bone, and beads of terracotta, jasper, etc., and one of gold as well.

Period III is characterized by the occurrence of the Northern Black Polished Ware with three sub-phases accounting for a total thickness of 2'1 m occupational deposit. In the early phase, the small-sized incurved bowl, popularly called the miniature bowl and the pear-shaped vase known as Ahichchhatra type 10 A, were conspicuous by their absence; these types appear only in the middle phase. In the late phase, the quality of the Northern Black Polished Ware was on the wane, and there was a preponderance of coarse grey ware. In the lower levels of the early phase, a few sherds of the Painted Grey Ware were also noticed. Interestingly enough, a sherd of fine grey ware fabric was found painted on the interior with black lines, and had the typical Northern Black Polished Ware finish on the exterior over which a row of sigmas was painted in black pigment. This and other specimens show an intimate interrelationship between the last stages of the Painted Grey Ware and the beginning of the Northern Black Polished Ware. No baked brick structures were met with in this early phase. The end of the Northern Black Polished Ware was marked by a burnt layer running althrough the section.

An outstanding discovery of this season's work was a large-sized rectangular tank which was exposed to a length of about 100 m without getting its ends. It was dug into the natural soil, the sides being retained in a terraced fashion by three successive baked brick walls with battered back against the natural soil. The massive wall found last year belongs to this tank-complex.

The tank seems to have been fed by the water of the Ganga while in spate. Though the full details of the (unlined) channel (pl. XXVI A) which brought the water is yet to be determined, its existence was identified immediately outside the northern end of the tank. The incoming water dashed against the mouth of the tank, which was in the form of an arc of a circle, made of baked bricks (pl. XXVI B). Near the middle part of this arc, there was a 2-m wide channel, lined with baked bricks, through which the water entered the tank proper. In order to ensure that the water gushing into the tank did not erode the base and the side walls, the bricks at the base of the inlet channel were arranged in a stepped fashion (pl. XXVII A). A part of the floor of the tank near the inner mouth of the channel was found to have been payed with unusually large bricks, measuring 64 X 48 X12 cm. However, the usual size of the bricks used in the construction of the tank was: 41.5 to 44, 27.5 to 28.5, 6 to 7 cm.

The entire tank was divided into two parts which are interconnected with a channel paved with large-sized bricks (64 X 48 X 12 cm). From this channel the water cascaded over a flight of steps into the inner and larger part of the tank. A staircase (pl. XXVII B) comprising five steps, with each step having four courses of bricks, was provided to enable the bathers to come down from the mud-platform of (the middle) retaining wall to the top of a brick platform forming as a part of projection of the lowest retaining wall. The inner part of the tank starts with the turning outwards of the lowest retaining walls from this point. On the other side of the channel, there is another platform with 17 courses intact. The inner (south-western) part of the tank was not only bigger in width than the outer (north-eastern) one but was also relatively deeper. In it the lowest retaining wall went down to a depth of 47 courses. At one place in the inner tank, a series of seven steps (pl. XXVIII A) were provided for coming down from the top of the platform of the second retaining wall to that of the third one. The length

of this part of the tank still remains to be ascertained, although at a distance of about 35 m towards south-west from these steps some structural remains were noticed which may possibly constitute parts of the retaining walls. From the silt and brick debris in the section it appears that there were two phases in the life of the tank. On the basis of the associated pottery, terracotta female figurines (pl. XXIX A-B) and other objects, the beginning of the tank may be placed in the first century A.D.

The habitational area yielded large number of structures of baked bricks, ascribable variously to the Maurya, Sunga, Kushana, Gupta, Rajput and medieval times. In this context, particular mention may be made of a structural complex on the main mound SVP-1, which consisted of several rooms with successive brick-floorings, a drain (pl. XXVIII B) and a soakage-pit. The last-mentioned was dug down to a depth of about 4 m without reaching its bottom. It was lined with bricks, the number of courses being over 90. Among the antiquities mention may be made of finely executed terracotta figurines (pls. XXIX C-D and XXX A, B, C and D) belonging to the Northern Black Polished levels, Sunga, Kushana and Gupta times. Besides coins, seals and sealings (one of them with a legend reading *Dhankesa),* etc. three copper vessels, one of them being spouted, and a long handled laddle, ascribable to the third century B.C., were also obtained from the excavation.

14. EXCAVATION AT MAHADAHA, DISTRICT PRATAPGARH.—In continuation of the last year's *(1977-78,* pp. 58-59) work, the Department of Ancient History, Culture and Archaeology, University of Allahabad, resumed excavation under the direction of Shri J. N. Pal and under the general supervision of Professor G. R. Sharma. The work was confined to the cemetery and butchering areas.

While the excavation (pl. XXXI A) was in progress last year it had been observed that the western part of the cemetery was covered by the dump of the canal embankment. Before the excavation was taken up in the area, the embankment earth, therefore, had to be removed. While doing so, the earth was carefully examined with a view to finding any skeletal remains. In this process remains belonging to at least 17 individuals were collected.

In the cemetery area, though the work was confined to the last phase, i.e. Phase IV, three graves, one belonging to Phase II and the other two to Phase III, were unearthed. Altogether ten graves of Phase II were exposed. All the graves were found to be shallow and oblong pits filled with loose soil containing burnt clay lumps, charred animal bones and ash, placed over the dead body. Some of the graves yielded bone arrowheads, microliths, snails, jaw of carnivore animal, possibly dog, and tortoise shell. All the burials, except one, were of the extended type and generally oriented east-west with head placed either towards east or west. However, two burials were found oriented from south-east to north-west. In the case of six graves, the skull of the skeleton was found placed on slightly raised ground. In some other cases, either the feet or the feet and head both were placed on raised ground. The majority of skeletons had their head tilted towards left but in two cases it was found to be towards right. In the placing of the hands no uniform practice appears to have been observed. While in some cases, both the hands were extended along the body, in others the left hand was placed along the body while the right one on the sacrum or the right hand along the body and the left placed upward or the right hand along the body and the left one on the left pelvic or abdomen. In one example, the right hand was found placed on the right pelvic while the left hand was found below the left pelvic (pl. XXXII A). In another case the two legs were found folded upward. Of the skeletons recovered, the sex of the twelve could be identified, seven as of female and five of male. They belonged to the age group from seventeen to forty excepting perhaps one belonging to fifty or more years. The skeletal remains of two children, one of six (pl. XXXII B)

and the other of four years, were also found. The bones without exception had turned brownish chocolate in colour, but were found to be well preserved.

Besides the burials, the excavation brought to light twenty-seven hearths, all belonging to Phase IV. The hearths are shallow pits, oblong or circular on plan, with sides and bottom plastered with clay (pl. XXXI B). However, some of the hearths were not plastered. Several layers of plaster were seen in some of the hearths. The longer axis of the hearths varied from 1.71 m to 40 cm, while the shorter axis ranged from 1.53 m to 26 cm. One of the hearths yielded a skull and horns of a bison. The hearths were usually found filled with burnt clay lumps, charred, semi-charred and uncharred animal bones, tortoise shell and bones of birds.

Excavation in the butchering area yielded animal bones in profusion, most of which showed cut marks. The species identified include cattle, sheep, goat, pig, deer, tortoise, etc. The bones had acquired same colour as in the case of human bones from the cemetery and also had acquired weight.

15. EXCAVATION AT HULAS, DISTRICT SAHARANPUR.—The Excavations Branch (II) of the Survey under Shri K. N. Dikshit, assisted by Sarvashri B. P. Saxena, V. C. Sharma, B. R. Meena, D. V. Sharma, R. S. Sharma, B. B. Sharma, Lai Singh and D. K. Malik, excavated the site at Hulas (Lat. 29° 42' N and Long. 77° 22' E), located in Kakur Tehsil, about 8 km west of Manauta. The site, rising about 5 m above the surrounding plains, measuring approximately 330 m north-south, and 172 m east-west, was excavated with a view to ascertaining : (i) the character of the Harappan culture in the peripheral zone, especially in the doab; and (ii) its interrelationship, if any, with other contemporary cultures. Excavation revealed a five-fold cultural sequence.

Period I, represented by 1.4-m thick deposit, yielded the typical Harappan ware (pl. XXXIII A), both painted and plain as well as some non-Harappan wares. Among the new forms, mention may be made of dish-on-stand with drooping rim, jar with horizontally splayed out rim, bowl-like lid with central knob and a few miniature pots with a ring or pedestalled base. The painted motifs executed in black comprised simple bands, triangles, rows of hatched diamonds with horizontal bands, chains within bands, leaf-patterns and dancing peacock with hatched body. The incised decorations on the exterior of the pots consisted of a set of wavy lines, sigmas, chevrons and cord impressions. The number of incised sherds, however, was not very large. A single sherd with compartmented designs on the inner side was also noticed. Other finds included: terracotta objects such as beads, bangles, animal figurines, cart-wheel with raised central hub; faience beads and bangles; beads of agate; fragmentary copper bangles; bone points; and stone querns and pestles. The terracotta cakes (pl. XXXIII B) were oval in shape with pointed ends, although other varieties like the rounded ones with deep finger impressions m the centre were also found.

An oval-shaped hearth (pl. XXXIV A) was encountered at the southern edge of the habitation. It contained, besides a dish-on-stand, a fragmentary baked brick showing husk marks which obviously was used as degraissant. A solid mud structure, possibly a platform running from north-east to south-west, was also encountered. It was possibly built as a protective wall against the floods. A ditch or an ancient rain-gulley, about 90 cm to 1.2 m deep, was noticed at the depth of 4.3 m below surface in the middle of the mound.

Period II is represented by the Painted Grey Ware and its associated wares. The people of this Period did not occupy the area deserted by the Harappans but instead settled on the virgin soil lying to the north and east of the Harappan settlement. Pottery of the Period is represented by Painted Grey Ware (pl. XXXV A and B), plain grey, black-and-red, black-slipped and associated red wares. Noteworthy motifs on the Painted Grey Ware were groups of straight lines separated by two rows of dots and wavy lines. Individualistic designs like concentric circles, semicircles and sigmas were mostly confined to the outer side, barring

a few on the inner side. The shapes in the associated red ware were lid, lid-cum-bowl, jar and basin, etc. In the black-slipped and black-and-red wares the common forms met with were bowls and dishes. A strap-handle in black ware was also noticed. Among the structures of the Period mention may be made of a mud floor with post-holes. Other finds include: bone stylus and points; copper objects including antimony rods; iron slags; terracotta objects such as *ghata*-shaped beads, discs, bangles; and stone objects.

Period III, represented by a 70-cm thick deposit, yielding the Northern Black Polished Ware, grey, black-slipped and associated red wares, overlapped with the Painted Grey Ware culture. The Northern Black Polished Ware was represented by a limited number of sherds. Important shapes in the grey ware are straight-sided bowls, cups and dishes with incurved sides and sagger of convex base. Common types represented in the red ware are Ahichchhatra type 10 A, carinated-handi basin, storage jar, vase, miniature pot, lid and bowl. Of particular interest was a high double storage jar (pl. XXXVI A). The diameter of the inner and outer storage jars was 1.0 and 1.15 m respectively. Both the jars were found crushed. An important structure of this Period was an elliptical hearth comparable to those found at Mathura and other north Indian sites. Important finds of the Period include: terracotta objects like beads, wheels, human and animal figurines; stone balls; bone points; and beads of glass and carnelian.

Period IV represented by the Sunga-Kushana times had a 1.4 m thick deposit, overlying the Period III deposit. It was characterized by plain and incised red ware. The common types included spouted jars, lids, sprinklers, bowls, storage jars, basins, etc. A massive baked brick structure (pl. XXXVI B) was also encountered in this Period. The wall of the structure had a width of about 2.1 m. The size of the bricks used was 52 X 28 X 8 cm. The extant height of the wall was approximately 66 cm with eight courses of bricks. The exposed east-west arm of the structure was about 60 m long and the north-south one 30 m, the other sides still remaining to be exposed. The corner of the structure is rounded off with a projecting rectangular platform on the inner side. Notable finds of the Period include beads of semi-precious stones, copper coins, shell bangles, bone pieces, terracotta objects including plaque showing mother With child, beads, bangles, sealings, animal and human figurines.

Period V (Gupta to early medieval times) was represented by a 70-cm thick deposit, yielding painted and moulded pottery (pl. XXXIV B). The decoration included naturalistic and geometric designs. Special mention may be made of a red ware sherd decorated with a swan flanked by amorous couple.

16. EXCAVATION AT PARIAR, DISTRICT UNNAO.—Under the project, Archaeology of the Ramayana Sites, the Excavations Branch (II) of the Survey, in collaboration with the Indian Institute of Advanced Study, Simla, undertook excavation at Pariar. The work was jointly directed by Professor B. B. Lai of the Institute and Shri K. N. Dikshit of the Survey, assisted by Sarvashri B. P. Sexana, V. C. Sharma, B. R. Meena and Dharam Vir Sharma. The main aim of the excavation was to ascertain the antiquity of the site. Five trenches (PRR-1 to PRR-5) of varying sizes were laid out at different places of the mound.

Excavation in PRR-3 (pl. XXXVII A) revealed in the lowest levels, a 60-cm thick deposit of loose brown earth and sand with occasional hard clods, yielding Ochre-coloured pottery, black-slipped and black-and-red ware sherds. It is very likely that all these sherds got washed down to this sandy deposit from some nearby habitation. The Ochre-coloured pottery is represented by small fragments of sherds but for a sizeable fragment of a jar with horizontally splayed out rim. Below this deposit, a few sherds of the upper levels were found percolated to a depth of 1.15 m in the natural soil. However, overlying the above-mentioned sandy deposit was a 40-cm thick regular stratum, yielding black-slipped, black-and-red wares and associated red ware. Dominating types in the black-slipped ware were the dish and the bowl. Among the

antiquities mention may be made of terracotta beads and discs, bone points and copper and stone objects.

The succeeding period was characterized by the Painted Grey Ware represented by a deposit of nearly 30 cm. The sherds, though only a few in number, belonged to dishes and bowls. The painted designs were limited to floral and geometrical motifs. Amongst the antiquities, mention may be made of *ghata*-shaped beads and discs of terracotta and bone points. A series of post-holes were also encountered in this level.

The early levels of the next succeeding period showed continuation of the pottery tradition of the preceding period along with the Northern Black Polished Ware. The occupational deposit was of 40 cm thickness. It was further noticed that these early levels were conspicuous by the absence of miniature bowls, carinated *handi* and Ahichchhatra type 10 A, which however emerged slightly later in the next 60 cm deposit of this Period. Important antiquities recovered include: terracotta female figurines, wheels, skin-rubbers, beads, discs, bangles, gamesmen; bone points; and antimony rods of copper. Among the structural remains noteworthy is a terracotta ring-well (pl. XXXVII B). It had four rings intact. A few brick-kilns, with the top portions missing were also noticed.

A flimsy deposit of Sunga-Kushana period was noticed in the uppermost three layers of PRR-1 and PRR-2.

B. Other Excavations

Andhra Pradesh

17. Excavation at Hullikallu, District Anantapur.—The Department of Archaeology and Museums, Government of Andhra Pradesh, excavated the ash-mound and habitation site of Hullikallu. The stratigraphy observed in the excavation of the ash-mound is as follows from top downwards: layer (1), recent humus of 5 cm thick with ash and brownish morum; layer (2), compact brownish clay, mixed with ash and *kankar;* layer (3), loose ashy clay, 30 cm in thickness; layer (4), a floor level, 5 cm in thickness made of rammed clay with chips of schist and plastered with lime, dark brownish clayey patches suggesting stagnation of water for some time; layer (5)_, loose ashy clay with nodules of ash; and layer (6), resting over the natural soil, dark brownish loose clay with ash and sand, also showing evidence for stagnation of water.

Another smaller ash-mound was noticed just adjacent to the above one without any intervening space. A few post-holes were noticed at the southern periphery of the mound. Excavation at the south-eastern end of the mound revealed, below the ash deposit, rectangular cattle-pens indicated by post-holes at regular intervals of less than 10 cm. A dump of animal bones of bovine species and another dump of pot-sherds of black-and-red ware were noticed near the cattle-pens. Besides, a floor level with a channel, 30 cm deep and 3 m long, with seven post-holes on one side, was also noticed.

The cultural sequence obtained from the excavation of the habitation site revealed the neolithic/chalcolithic culture succeeded by an overlap phase between the neolithic/chalcolithic and the megalithic Iron Age culture. The upper levels are represented by the black-and-red ware culture. The pottery collected from the neolithic/chalcolithic levels include unburnished grey or black, burnished grey, black, buff, pink, perforated and incised wares besides ochre painted and black-on-red painted ware. The pottery was generally handmade but a few miniature pots seem to have made on slow wheel. The types represented are jar with everted rim, globular vase and deep bowl with featureless rim, straight-sided vase, spouted vessel and channel spouted vessel. A large number of polished stone tools showing different stages

of manufacture were recovered from the earliest levels as also from the surface. The tools include spheroid rubbers, anvils, axes and fabricators. Besides, microlithic blades and cores, made on chalcedony and chert, during excavation were also encountered. Other important antiquities, encountered include steatite disc beads, tabloid shell beads, carnelian beads and bone tools such as chisels, points and borers.

Three burials, one of extended inhumation types and the remaining two of urn-burial type, were also encountered in the excavation. The extended burial, datable to the overlap phase, was oriented east-west, the head being on the west. The skeleton, almost intact but for a few missing small bones, measured 1.7 m in length. The grave furniture included a deep bowl of black-and-brown ware, a vase of coarse red ware and a polished stone adze. One of the urn-burials was found in a pit scooped out under a huge standing boulder. The urn contained skeletal remains and a skull of a child. The urn, a globular pot of grey ware with an everted rim, was found covered by a basin-like lid with a long (3 cm) tubular spout. The tip of the spout and the underside of the lid were painted with ochre bands. Another urn-burial was also found under the same boulder, 1 m west of the above-mentioned one. The urn had a few fragile skeletal remains such as ribs, ulna, etc., but without skull. The burial furniture consisted of four miniature pots of burnished grey ware decorated with ochre bands on the rims. These two burials were encountered in the upper levels of the neolithic/chalcolithic phase.

18. EXCAVATION AT KEESARAGUTTA, DISTRICT HYDERABAD,—In continuation of the last season's *(1976-77,* p. 3) work, the Department of Archaeology and Museums, Government of Andhra Pradesh, resumed excavation at Keesaragutta with a view to exposing more structures. The excavation revealed a brick (49 X 26 cm) built structure with three rooms (2.0 X 2.65 m) fronted by a verandah (2.5 X 8.5 m), a porch and flight of steps provided with *chandrasila* resting over a granite slab. The exterior of the porch had two offsets, one at the height of 28 cm and the other at 47 cm, topped by torus moulding. The exterior of the structure was found finely plastered.

A shrine (pl. XXXVIII A) having a *garbhagriha* (2.8 X 1-9 m) and an *ardhamandapa* (2.35 X 2.20 m) with a flight of steps flanked by balustrades on either sides, was found to the west of the above-mentioned structure. Both inner and outer surfaces of the walls were plastered; the flooring of the shrine was made of rammed *morum* covered with lime plaster. The interior of the back wall was provided with mouldings, flat one at the base succeeded by torus moulding over which stood three *koshthas.* On the exterior, the basement of the shrine was provided with three offsets, one at the base, the other at a height of 35 cm and the third at a height of 65 cm. At the top was the torus moulding made of faceted bricks and deep groove below the moulding. A skeleton, probably of a middle aged man, was found at the basement level, 2 m away from the shrine. The skeleton, the head facing down and hands joined together above the head, in *anjali-mudra,* probably represents *narabali* performed before the construction of the shrine. This structure seems to have been enclosed by a wall of 1.5 m width as evidenced from the remains identified at a distance of 3.65 m from the near wall.

Another shrine facing west with a *garbhagriha* and an *ardhamandapa,* provided with a flight of steps, was encountered opposite the above one. Adjacent to this shrine was found another structure similar to the above-mentioned one with three rooms.

Antiquities recovered from the excavation include: potin coins of the Vishnukundins; iron objects such as knives, domestic trowels, rods, tweezers, rivets, chisel-heads, sickles, rings, etc.; terracotta objects including a figurine of mother goddess made of single mould and adorned with *makarika-type* of hairdress, spool-shaped earstuds, pear-shaped beads; human and animal figurines in stucco; and stone plaque of mother goddess holding a *linga* on *panavatta* in the raised right hand (pl. XXXVIII B) and a head of a lion in the left hand besides figures of *nandi* and a man depicted on it. Mention may be made of an earthern pot decorated with

seven snakes encircling the pot and five female (demon-like) figures (pl. XXXVIII C). The lid over the pot has a human finial shown sitting on a lotus pedestal with legs flexed and resting over the pedestal. This pot, found at the north-western corner of the *ardhamandapa,* may be consecreted at the time of raising the *sikhara* of the shrine.

19. EXCAVATION AT CHAGATUR, DISTRICT MAHBUBNAGAR.—In continuation of the last year's *(1977-78,* pp. 11-12) work, the Department of Archaeology and Museums, Government of Andhra Pradesh, resumed excavation with a view to exposing more structures. Excavation in the area further north of the earlier excavated trenches revealed that the massive enclosure wall, encountered in the last season's excavation, continues in north-south direction. This wall has been exposed to a length of 50 m. However, details of this huge structure are concealed under the Anjaneyasvami temple and dilapidated structures of Chagatur village. Interesting feature noticed in the massive wall is that it was provided with circular sockets at regular intervals, extending up to the natural bed-rock. This structure is dated to Period I. Other important antiquities recovered include terracotta figurines, beads and ivory stylus.

Further excavation inside a cist burial after removing the floor-slab revealed that it had nothing below the slab. Besides, a group of cairn-circles was noticed towards north of the village. One of them was a cist burial with double circles of boulders. This burial has been taken up for excavation and dressed stone circle has been exposed in all the quadrants.

20. EXCAVATION AT CHINNAMARUR, DISTRICT MAHBUBNAGAR.—The Department of Archaeology and Museums, Government of Andhra Pradesh, carried out excavation at Chinnamarur with a view to ascertaining the cultural sequence of the site.

Excavation in the neolithic/chalcolithic habitation site revealed two phases of occupation, the lowest being of the neolithic culture yielding pale-grey ware, painted with simple designs. The upper levels of this deposit is represented by the chalcolithic culture characterized by grey, burnished grey and black wares. The sherds of the last-mentioned ware had a glossy surface. Spouted vessels were found in large number. A large hearth, few post-holes and a tool made of stag-horn were found from this level. Besides, a number of tools belonging to the pecked and ground stone industry were also recovered. In the chalcolithic level, plans of two huts, one being semi-circular and the other parallelogram, were encountered. The floors of these huts were made of shale stone rubble covered with lime plaster. Three pottery-kilns were also encountered in this level. Other antiquities recovered from the chalcolithic level include; axes, chisels, adzes made on dolerite, bone arrowheads; microlithic tools, including ribbon blades; beads of steatite, rock-crystal, agate, carnelian; rings and bangles of copper; and terracotta figurines of unidentifiable animals. A large number of animal bones was also recovered from both the phases.

Excavation at the cemetery of the chalcolithic phase yielded two groups of burials, one having four and the other three skeletons. It was observed that the grave pits were scooped out of the hard bed-rock and thereafter plastered with clay. In one group, a skeleton was found with a pair of toe rings and the other with a biconical carnelian bead in the left ear and one more similar bead on the neck. In the other group of skeletons, one was found with a spiral copper bangle with bell-shaped ends in the left arm. In both the groups no skeletal remains of a child were noticed. The length of the skeletons varied from 1 to 1.75 m. The dead were buried in north-south orientation, face turned either towards east or west or in supine position. A channel spouted vase in grey ware was found near the head of a skeleton of one group and a bowl of grey ware was found placed near the legs of a skeleton in the other group. Except these two vases no grave furniture was encountered.

Excavation inside a rectangular enclosure (18 X 2.75 m) with walls of shale-stone built over the bed-rock with extant height of 30 cm, revealed that the area had been completely

disturbed due to agricultural activities in the recent times. However, the 30-cm thick deposit over the bed-rock yielded vases and jars of coarse red ware, beads of terracotta, rock-crystal, carnelian, jasper and bangles of shell.

A few cist burials were also located on a part of the above-mentioned site. Of these, two were excavated. Gist 1, measuring 1.95 X 0.40 X 0.50 m and provided with a floor slab, was found without any skeletal remains. Cist 2 (1.40 X 0.35 x 0.40 m) had a skeleton oriented north-south. The skeleton, measuring W2 m, had its legs flexed, while the hands are missing. An iron dagger (19 cm) was placed near the pelvis. The funerary goods consisted of: a red ware vase with arrow shaped graffiti mark over it and a lid-cum-bowl placed at the left side of the body; a red ware vase covered with lid placed at the left leg; a deep bowl of Black-and-red Ware placed at the south-eastern corner; and a Black-and-red Ware bowl covered with a lid with knob of polished black ware placed at the leg. Four more cists were also exposed. The excavation will be resumed next year.

21. EXCAVATION AT PAGIDIGUTTA, DISTRICT MAHBUBNAGAR.—The Department of Archaeology and Museums, Government of Andhra Pradesh, carried out excavation to ascertain the cultural sequence of the site. The excavation revealed a three-fold cultural sequence.

Period I, belonging to the chalcolithic culture, is characterized by burnished grey and black-on-red wares. Among the types encountered, mention may be made of channel spouted bowl, perforated vase, mat-impressed and panelled storage jars and a pot with applique designs. Tools belonging to the microlithic and ground stone industry were also found. A number of hearths and post-holes were located. Noteworthy find, however, is that of an antimony rod of copper.

Period II shows overlap between the chalcolithic and the succeeding Iron Age, i.e,, megalithic culture. Besides continuation of the pottery, stone tools, micro and disc beads of steatite, iron implements and black-and-red ware occur in this Period. Floorings belonging to semi-circular huts were exposed in different levels of this Period.

Period III, represented by black-and-red and other associated wares, is marked by massive circular wall, 150 m in diameter. The enclosure having entrance on the north had housed many semi-circular huts. A solitary sherd of the Rouletted Ware was found in the upper level the Period.

22. EXCAVATION AT UPPALAPADU, DISTRICT MAHBUBNAGAR.—In continuation of the last year's *(1977-78,* p. 12) work, the Department of Archaeology and Museums, Government of Andhra Pradesh, resumed excavation to expose more megalithic burials. Out of six burials excavated this season, four burials (Megaliths I-IV) belonged to pit-burial type and the remaining two (Megaliths V-VI) to cist burial type.

Megalith I was huge pit-burial (pl. XXXIX A), oriented north-south, surrounded by a stone-circle of 7.9 m diameter, covered by shale slabs and also by rubble packing rising to a height of 1.5 m from the surrounding level. A ramp lined with shale slabs forming a passage leading to the pit was provided on the south. At a depth of 1.25 m in the northwestern quadrant and at 1.3 m in the north-eastern quadrant, a pot of red ware and a vase of Black-and-red Ware were found respectively. Interestingly, below these vases were two small oblong cists, measuring 97 X 33 X 23 and 80 X 30 X 22 cm. The former cist contained only a pot of red ware and the latter two copper rings and pieces of tooth. The actual pit, oval in shape, was found below these cists. The pit contained twelve adult skulls as well as fragmentary long and small bones, Black-and-red Ware pots and iron objects. On the floor of the pit a transepted cist was encountered.

Megalith II was similar in construction to the above one but had three cists on the floor of the pit (pl. XL A). Among the three cists the middle one was larger in size and yielded one

adult skull and ten long bones. The western cist had one skull and six long bones whereas the eastern one had an adult skull, lower jaw with tooth, three long bones and a vase of red ware. The grave goods were found around the cists and consisted of two skulls, hand and leg bones, twelve pots, one conical lid of black ware and a stand of black ware. A miniature pot was found near a skull probably indicating that it belonged to a child.

Megalith III was 3-34 m in diameter. The pit was sealed by eight shale slabs and cairn packing (pl. XL B). There was no ramp and it was only 53 cm deep. The pit had neither burial offerings nor the cists. Probably it was a dummy.

Megalith IV was similar to the above-mentioned one.

Megalith V was an oblong cist (pl. XXXIX B), measuring 1.9 X 0.65 m. The orthostats were closely juxtaposed. No passage was provided to the cist. It was surrounded by dressed shale slabs and rubble. The floor slab was reached at a depth of 50 cm. The cist contained one long bone and three small bones. Neither pottery nor iron objects were encountered in the cist. Since the bone pieces were found at the top level of the cist, it may be presumed that this burial was also disturbed.

23. EXCAVATION AT CALINGAPATNAM, DISTRICT SRIKAKULAM.—In continuation of the last year's *(1977-78,* p. 14) work, the South-eastern Circle of the Survey under the direction of Dr K. Krishna Murthy, assisted by Sarvashri D. Hanumantha Rao and G. V. Srinivasa Rao, resumed the excavation of the Stupa-mound with a view to (a) laying bare the complete plan of the stupa; and (b) finding out the early cultural horizon at the site.

The excavation revealed the existence of a large brick-built stupa, having hub and wheel pattern plan (pl. XLI A). There are three concentric rings (excluding the hub), each connected with the other by means of radiating spokes. The diameter of the circle is 26-4 m. The stupa is provided with brick paved *pradakshinapatha* (pl. XLI B) of 3-4 m width, but no traces of railing were noticed. The stupa is comparable to the *Mahachaitya* at Nagarjunakonda. The central hub was found to be destroyed to a larger extent, but the available traces indicated that it was of square shape. The concentric rings, i.e. the inner, middle and outer, had twelve, twenty-four and thirty-six spokes respectively.

Excavation in the western side of the main stupa showed that the stupa, excluding the *pradakshinapatha,* was enclosed by a massive brick-wall of later date, square on plan, of which the purpose was not known. The stupa was bereft of sculptural veneering. However, traces of thick lime plaster were noticed at several places on the walls and also on the floor. Bricks of several sizes had been used in the construction of the stupa. The largest brick measured 55 X 27.5 X 10 cm. Further ^ a few votive stupas of different diameters with solid core were also noticed on the western side, adjacent to the main stupa. Natural soil was struck in few of the trenches which revealed that there was no structural activities below the stupa-level.

The cultural deposit of the site, however, is 2-3 m in thick. The most important ceramic of the lowest level is the salt-glazed black ware, represented by shallow bowls with flat base, cups with wide mouth, of which the former is invariably provided with short pedestal. The other associated pottery with this ware is Black-and-red Ware of the megalithic fabric and pale-red ware. The basal layer on which the stupa was built yielded the Rouletted Ware, red polished ware and knobbed ware of Sisupalgarh type. On the basis of the datable ceramics and also from the brick sizes, the following chronology is suggested.

Period I	Pre-stupa level	300 B.G. to A.D. 100
Period II	Main stupa	A D- 100 to 200
Period III	Later additions including square enclosure wall.	A.D. 200 to 400

Bihar

24. EXCAVATION AT KATRAGARH, DISTRICT MUZAFFARPUR.—In continuation of the last year's *(1977-78,* pp. 15-16) work, the Department of Archaeology and Museums, Government of Bihar, under Dr Sita Ram Roy, assisted by Sarvashri Durga Nand Mishra 'Sudha', Krishna Kant Sharma, Narain Chandra Ghosh, Lakshman Prasad Singh, Rajendra Prasad Singh and Uma Shankar Pandit, resumed excavation with the view not only to confirm the results of the preceding season's work but also to throw more light on the nature of defences. Excavation, while confirming three phases of construction in the rampart, revealed many details of the defences. The pottery and the antiquities encountered during this season were same as those found earlier.

25. EXCAVATION AT SARAI MOUND, NALANDA, DISTRICT NALANDA.—In continuation of the previous year's *(1977-78,* p. 16) work, the Mid-eastern Circle of the Survey under Shri R. S. Bisht, assisted by Dr B. Nath and Shri B. S. Jha, resumed excavation at Sarai mound. The partially exposed lotus-seat was fully laid bare and found to bear successive lime coatings, bearing traces of paintings in red. The large feet of a one-time gigantic image, possibly of a standing Buddha, made of earth mixed with pieces of pottery and bricks and plastered over with thick coatings of lime, were exposed during the excavation. The toes of the feet were found to be damaged while the rest were intact up to a little above the ankles. The image, when intact, should have measured between 18 to 20 m height, as calculated on the basis of the iconometric principle of the *talamana.* The cracked and bulged portions of the image were reset and conserved. Further, more votive stupas arranged in rows were unearthed on the east and south of the temple and the debris on the western and southern sides was removed. It was observed that the temple and the votive stupas were renovated several times.

A small shrine, showing two successive phases of construction was exposed to the northwest of the main temple. The walls of the shrine and the platform on which an image of Buddha might have been installed were found robbed and disturbed. However, the image of seated Buddha was found inside the shrine. A hoard of fifty-one sealings, bearing the Buddhist formulae was also unearthed from the shrine.

Two human skeletons, the grave pits of which were cut into the debris of the temple indicating their late date, were found in seated posture with folded hands—a practice which is still followed while burying Hindu *sanyasi.*

26. EXCAVATION AT APHSAD, DISTRICT NAWADAH.—In continuation of the last year's *(1977-78,* pp. 16-17) work, Dr Prakash Charan Prasad, assisted by Sarvashri Jamil Akhtar and Raghunath Prasad Verma, under the general direction of Dr Sita Ram Roy of the Depart ment of Archaeology and Museums, Government of Bihar, resumed excavation at Aphsad (pl. XLII A).

Excavation confirmed the earlier observations that the Vishnu temple was built in different diminishing tiers, possibly six in number, and each tier had a circumambulatory path. Two more brick-paved platforms, plastered with lime and *surkhi,* measuring 1-64x0-88 m each, were exposed on the second tier. The exact nature of these platforms could not be ascertained. Probably these were places for meditation. The ceramic industry was represented by a few sherds of red ware.

Gujarat

27. EXCAVATION AT PUBUMATH, DISTRICT KUTCH.—In continuation of the last year's *(1977-78,* p. 21) work, the Department of Archaeology, Government of Gujarat, resumed

excavation at Pabumath, and confirmed the result of the last year's work. The pottery and other antiquities were of the usual type. However, mention may be made of copper arrowhead without mid-rib but with splayed ends from the earliest level, bangles, needles, beads and earrings in bone and shell and a small bone knife or dagger with a gradually curving edge. Another interesting find from the upper level is that of a broken Harappan seal made of steatite bearing unicorn motif and a few Harappan letters.

28. EXCAVATION AT ANHILWAD PATAN, DISTRICT MAHESANA.—The Department of Ancient History and Archaeology, M. S. University of Baroda, under Professor R. N. Mehta and the Western Circle of the Survey under Dr C. Margabandhu, assisted by Dr V. S. Parekh, Sarvashri Momin, Sonawane, N. M. Khatri, C. U. Bhagat of the University and Sarvashri R. Pathak, P. K. Trivedi, S. S. Naik, H. Michael, A. R. Shah and H. A. Shinde of the Survey, jointly carried out excavation at Anhilwad Patan, with a view to ascertaining the cultural sequence of the site known as Rajagadhi.

Excavation revealed a fortification-wall, circular on plan with traces of bastion or entrance, built of baked bricks of different sizes, set in mud mortar. The foundation of the fortification was made up of irregular stones probably of a dilapidated temple. A number of structures constructed prior to the fortification-wall were also encountered. Among them mention may be made of a brick-built platform, resting immediately above the natural soil, and having small sandstone blocks placed vertically and a flat slab with engraving of trident pointing towards north-east. This was probably *kurma-sita* of north-east identifiable as *saubhagini-sita.* It was observed that a number of structures had been raised over the fortification-wall after its main function came to an end.

The ceramics obtained from the excavation include: red ware represented by stemmed bowls, vases, etc.; black ware with pots, lids, etc.; glazed ware with red or buff base and green or blue glaze; Chinese porcelain and Celadon ware. Thus the earliest habitation encountered in the excavation may be dated to the eleventh-twelfth century A.D.

29. EXCAVATION AT TARAGHDA, DISTRICT RAJKOT.—The Department of Archaeology, Government of Gujarat, carried out a small-scale excavation at Taraghda near Rayadi in Jam Kandorana Taluk with a view to ascertaining the cultural sequence of the site. The excavation revealed that the mound was disturbed to a depth of 1.0 m by intensive digging by the local people. It was found that the site had been occupied only by the Harappan people. No structural remains, however, were encountered. The pottery showed remarkable similarity with that of Prabhas Patan. Other finds obtained from the excavation include shell objects, copper ring, carnelian beads and weights.

Haryana

30. EXCAVATION AT AGROHA, DISTRICT HISSAR.—The Directorate of the Department of Archaeology, Government of Haryana, undertook excavation at Agroha, traditionally believed to represent the site of Agreya Republic referred to in the *Mahabharata,* and said to have been founded by *Maharaja* Agrasena of the Agrawal community. During this field season, the excavation, without reaching the natural soil, progressed to a depth of 4.3 m from the surface, revealing an occupation extending from Saka-Kushana times to the early Gupta period.

The Saka-Kushana period was distinguished by structural remains of baked and unbaked bricks (size: 31 X 21 X 4.5 cm) representing two constructional phases. The pottery consisted of red ware of medium fabric represented by such shapes as Kushana bowls, sprinklers, carinated *handi,* and vases. Painting is almost absent on the pottery of this Period. Other important finds

Of this period include: copper ear-ring; iron objects such as clamps, rings, etc.; terracotta balls, discs; and shell bangle pieces.

The late Kushana to early Gupta period was represented principally by the remains of brick structures showing five phases of activity. A noteworthy feature observed with the structures of this period was the change in the pattern of construction of the houses which are constructed of re-used bricks of earlier period. Altogether five rectangular rooms, oriented north-south with entrances on the east as well as on the west, were exposed. A few niches were also found added in the later phase. Each constructional phase was distinguished by its associated mud floors with hearths and pit-ovens. The associated pottery is represented by red ware of medium fabric but with a distinct change in painting. The painted designs in black include loops, vertical, horizontal and criss-cross lines. The antiquities unearthed from this Period include: terracotta animal figurines, a moulded human head; copper coins, ring, antimony rod, bell, bangle pieces; beads and bangle pieces of shell; beads of carnelian, shell, copper, lapiz lazuli; and iron objects like arrowheads, clamps, chisels and nails. A terracotta sealing with a lenged *Sri Narayan Deva Prakrita* in Brahmi characters and Sanskrit language, palaeogra-phically belonging to the third-fourth century A.D., was collected from the surface.

31. EXCAVATION AT BALU, DISTRICT JIND.—The Department of Ancient Indian History, Culture and Archaeology, Kurukshetra University, under the direction of Drs U. V. Singh and Suraj Bhan, assisted by Drs S. B. Singh and S. P. Shukla, carried out small-scale excavation on a mound 3 km north of the village. The existing mound measures 210 X 180 m and rises to a height of 4.5 m from the surrounding fields. The total habitational deposit of 4·5 m was divisible into three phases A, B and C, primarily on the basis of ceramics. Phase A is represented by a 1-0-m deposit yielding ceramic industry of Pre-Harappan tradition mainly comparable with the late Siswal ceramics. No structural remains were encountered in this limited operation. However, the antiquities recovered include only terracotta bangles. Phase B, represented by a 2.2-m thick deposit, is distinguished by the introduction of mature Harappan pottery types in the otherwise ceramic traditions of the preceding phase. Regular structures, both monumental and domestic, appear in this Phase. These include a massive mud-brick platform exposed on the southern slope of the mound. The structure has receding ten courses of mud-bricks on either side, its width being 12 m. The bricks used in the platform measure 44 X 22 X 11 cm and represent largest size of typical Harappan bricks so far excavated on the site. The exact nature and plan of the structure remain to be ascertained by further excavation. Besides, remains of a few domestic structures, constructed of sun-dried bricks (sizes: 40 X 20 X 10 and 32 X 16 X 8), were partially exposed. Other important antiquities of this Phase include: terracotta animal figurines, bangles, toy-cart frames, wheels, balls, triangular and circular cakes, discs, sling-balls, nodules; bone points; stone balls, saddle querns and pestles; faience bangles; a few chert blades; beads of semi-precious stones, faiences; disc-beads of various sizes of steatite; and a few pieces of copper objects. Phase C, having a deposit of 1-3 m, revealed the continuity of the earlier non-Harappan and Harappan ceramic traditions with the sprinkling of late Harappan pottery types and designs comparable with that of Bara and Mitathal IIB. A number of structures, including a house-drain built of wedge-shaped bricks, built of mud-bricks measuring 40 X 20 X 10 cm, were encountered in this phase. Other finds of the phase include a few shell bangles besides all the objects recovered from the Phase B continue to occur in this phase.

Jammu and Kashmir

32. EXCAVATION AT SEMTHAN, DISTRICT ANANTNAG.—In continuation of the previous year's work, the North-western Circle of the Survey under Shri H. K. Narain, assisted

by Sarvashri S. L. Shali, S. N. Jaiswal, G. S. Gaur, J. M. Thapar, Balbir Singh and R. K. Kaul, resumed excavation at Semthan up to a depth of 10·5 m and natural soil could not be reached. However, from the deposit exposed, four-fold cultural sequence could be discerned.

Period I is characterized by the presence of two sherds of the Northern Black Polished Ware besides associated wares such as black-slipped, plain red and grey wares. The shapes represented in the pottery of this Period include variants of Ahichchhatra 10 A type, dishes, basins, vases and carinated rimless *handi.* No structures, except a few patches of flooring of rammed earth, were noticed. Other finds of the Period include: beads of different material; miscellaneous objects of iron; bone stylus; and copper coins and a seal bearing a highly obliterated legend in Brahmi script.

Period II is represented by a red ware industry. Important shapes available in this red ware are bowls with incurved rims, basins, button-knobed lids, ink-pot like lids and miniature vases. A few sherds showed stamped and incised decorations.

Period III is marked by the occurrence of pottery, having a regional manifestation, the vases of which show fine grained fabric with lustrous red slip. The shapes encountered are bowls, basins, vases, etc. Broadly speaking, this period roughly corresponds with the advent of stylized technique of stone architecture in the valley.

Period IV is represented by the pottery made of coarse to medium grained clay, exclusively wheel-turned and showing dull-red slip. A number of sherds were found to be decorated with stamped designs. The shapes represented are *handis,* flat plates, pedestalled cups and edged bowls.

Madhya Pradesh

33. EXCAVATION AT DANGWADA, DISTRICT UJJAIN.—An excavation was carried out at Dangwada jointly by Dr V. S. Wakankar of the Vikram University and Shri M. D. Khare of the Depatment of Archaeology and Museums, Government of Madhya Pradesh, assisted by Drs S. K. Arya, J. N. Dube and Sarvashri Raja Ram Singh and L. B. Singh. The mound known as Boreshwar, 1 km west of Dangwada village, covering an area of 340 m in length, 50 m in width and 15 m in height, revealed a five-fold cultural sequence.

Period I, divisible into two sub-phases, IA characterized by the Ahar pottery and IB by the Malwa pottery (pl. XLII B), is represented by 5.45-m thick deposit. The other cultural assemblages of the two sub-phases, however, are similar except that the terracotta bulls are available in large numbers in the former. A few mud-houses were encountered in the lowest levels. The houses were rectangular on plan and probably had roofs of wood, plastered with mud. The floors were made of rammed gravel and sand plastered with yellow earth. It is interesting to note that a few urn-burials encircled by stones were found inside the houses. The urn of lustrous red ware contained burnt bones, and a few dishes and terracotta bulls. Could it be that these burials were the forerunners of the megalithic burials? Other noteworthy finds include: a potsherd showing a painting of *Pashupati* (?) in black on red; a terracotta mould for copper axes (pl. XLIII A); a pot-stand with incised animal figures on the exterior (pl. XLIII C); and the remains of a variety of charred grains and animal bones. Period I came to an end with a large-scale conflagration, because of which even thick storage jars got completely disfigured.

Period II (pre-Mauryan and Mauryan) is marked by the continuation of black-and-red ware, besides the Northern Black Polished Ware and its associated wares and finds, notable being the punch-marked coins and a terracotta seal. With a deposit of 27 m, this Period also ended with a conflagration.

Period III (Sunga-Kushana), IV (Gupta) and V (Paramara) are represented in a deposit of 4 m and are marked by their distinctive pottery, terracotta figurines, inscribed seals, etc.

The discovery of two *yajna-kundas* from Period III indicates the revival of Vedic rites. One of these *kundas* was square and the other was semi-circular in shape. Carbonized grains of wheat, barley, and two other kinds were recovered from several pots used for the rites. A bell and a votive capital of copper were also found here. Other notable finds include: a terracotta seal, probably belonging to Period III but recovered from the debris of the succeeding Period, bearing a legend *Damodaram yajayi* in Brahmi characters of about the first century B.C., another seal with legend *Bhattaraka pada* in Brahmi characters of Gupta times from Period IV; a kaolin figure *o£ yakshi,* and terracotta figures of *yaksha* Kubera (pl. XLIII B), Buddha and mother goddess. The abundance of coarse grey and red wares with incised decorations and developed lotus designs mark the advent of Period V. A large number of pestles and querns of stone were found from all the levels of this site.

Maharashtra

34. EXCAVATION AT MAHURZARI, DISTRICT NAGPUR.—The Department of Archaeology, Deccan College Post-graduate and Research Institute, Pune and the Department of Archaeology and Museums, Government of Maharashtra, represented respectively by Professor S. B. Deo and Dr A. P. Jamkhedkar, resumed *(1971-72,* pp. 33-35) excavation at the site with the view to: (i) obtaining further data from the megaliths; and (ii) to correlating the date, if possible, with the results of the excavation at Naikund. Altogether twelve stone-circles in Locality III were excavated during this season.

The ceramic associations of all these stone-circles comprised megalithic Black-and-red Ware with graffiti marks and the micaceous red ware which had two types, viz. globular pot with flared mouth and flat-based dough plates. The third ware consisted of the dull-red fabric, some sherds of which bore geometrical paintings in black.

A distinctive feature of the burials noticed is the absence of fixed orientation. Secondly, whereas some of the dead were placed on a series of pots of micaceous red ware and iron objects, others were placed by digging a rectangular pits. In three cases, two persons were buried together. In most of the cases it was found that reddish earth was intentionally spread over and around the dead.

The iron objects buried with the dead comprised lamps, dishes, bowls, frying pans, nail parers, and a series of different types of chisels as well as lances, spikes, daggers, knives and *sulas.* The objects of copper include dishes, bowls, lids with bird or bud finial (pl. XLIV A) as also daggers with iron blade and copper hilt. A number of objects of gold in the form of neck and ear ornaments were also recovered.

In almost all these stone-circles, were found skeletal remains of horses with their iron and copper kit, like iron bits and ornaments for the face and the flanks (pl. XLIV B). The Mahurzari stone-circles have proved to be the richest in grave furniture so far in the Vidarbha region of Maharashtra is concerned.

35. EXCAVATION AT ARNI, DISTRICT YAVATMAL.—The Department of Ancient Indian History, Culture and Archaeology, Nagpur University, under Professor Ajay Mitra Shastri, assisted by Drs G.B. Deglurkar and Chandrashekhar Gupta, conducted excavation at the northern side of the habitational mound locally known as Pancha Pandava Tekadi, situated on the bank of the river Arunavati in Darwha Taluka. A three-fold cultural sequence was revealed, Period I belonging to the Megalithic culture, Period II to the Mauryan times and Period III to the post-Mauryan to Satavahana period. Period III, however, showed three phases of structural activity. The structures of phase 1 show use of massive baked bricks, measuring 54 X 27 X 9 cm. The foundation of the walls was laid by using big boulders. The houses which were either square or rectangular on plan were provided with wells and bathrooms. The wells

were constructed of wedge-shaped bricks. The bricks employed in phase 2 measured 48 x 24 x 8 cm. It was found that the walls were raised on a bed of pebbles. The floors were paved with brick-bats laid on compact earth. The structures of phase 3 were raised after demolishing the walls of the earlier phase. The bricks used were found to be ill-baked.

A wide range of pottery including painted tan, Black-and-red, micaceous red, red-polished wares, Northern Black Polished Ware, etc. was recovered from the excavation. The painted tan ware has been reported for the first time from this site, whereas the Black-and-red Ware and also red ware painted in black or white (occasionally) have been reported from several excavated sites in the Vidarbha region. The Black-and-red Ware occurs from the Megalithic period to the historical period (Period III). Mention may be made of the occurrence of a few sherds of Rouletted Ware and Kaolin ware. Besides, the excavation yielded a good number of copper and lead coins and a terracotta sealing. One of the coins bears the name of the Satavahana king Satakarni. Other finds recovered from the excavation include: ear-studs and beads of semi-precious stones, pearls, gold, glass, terracotta; shell and glass bangles; terracotta objects such as pendants, miniature human and animal figurines; and iron and copper objects. A big chunk of iron slag was also found below a wall belonging to phase 1.

Tamil Nadu

36. EXCAVATION AT MOTTUR, DISTRICT NORTH ARCOT.—The Southern Circle of the Survey under Shri L. K. Srinivasan, assisted by Sarvashri B. K. Sinha, P. R. K. Prasad, M. S. R. K. Prasad, T. Palani, P. Balan and A. S. Krishnan, carried out a small-scale excavation (pl. XLV A) in the extensive megalithic site near Mottur in Chengam Taluk discovered earlier by B. Narasimhaiah of the Survey. A unique and distinguishing feature of this site is the presence of a huge monolithic anthropomorphic figure (pl. XLV B) erected as a part of the hthic appendage of one of the megaliths in the site. The main objective of the excavation was to ascertain the nature of the megalithic burials in relation to other excavated types in Tamil Nadu and to know the relationship between the anthropomorphic figure and the megaliths.

Nearly sixty cairn-circles ranging from 3.5 to 12 m in diameter were noticed on the eastern slope of the hill known as Velur-malai between contours 282-277 m, in an area of 6'5 hectares. Almost all the burials were found disturbed. In all four megaliths, including the one with anthropomorphic figure, were opened. Of these, only one proved to be comparatively undisturbed while the remaining were found to be badly disturbed (pl. XLV1 A). The general features of the excavated megaliths are as follows.—

The average depth of the burial pit in three out of four examples did not go beyond 75 cm and the orthostats for the chamber were erected over the rocky substratum by scooping out the bed-rock. In the fourth example the pit was dug up to a depth of 1.66 m.

The orthostats (pl. XLVI B*)* of dressed granite slabs of roughly 10 cm thickness in three cases and 18 cm in the fourth case were arranged in the usual *svastika* pattern in anti-clockwise direction to prevent inward collapse. No capstone was found placed on any of them. A porthole was provided in the eastern orthostat in all the cases.

A large number of pots of different sizes and shapes, including one or more sarcophagi were found placed directly on the floor of the pit but within the chamber formed by orthostats (pi. XLVII A-B). The sacrophagi, invariably without cover, are placed in east-west orientation. Material equipment is almost similar in ail the cases save for some copper objects like a bowl, and a figure of deer (which probably served as the knob of the lid of the bowl) found in Megalith I and a copper bangle of thick section in Megalith II. Iron objects like chisels, knives, daggers and stone beads including etched camelian beads were common to all.

Usually the sarcophagi in each case contained fractional human interments indicating that they are secondary burials. While the Megalith IV contained two larger sacrophagi, placed side by side, accompanied by a smaller one placed at the western end of each. Megalith I probably had three sarcophagi. Two others had one sarcophagus each, the same being legged and smaller in size in Megalith III, thoroughly disturbed and mutilated.

The pots were placed close to each other and sometimes one above the other. A few of these contained skeletal remains of birds together with a small knife-like object of iron.

Pottery, all wheel made, consists of three wares, viz., black-slipped, Black-and-red and red wares. From the point of view of number and size the red ware is predominant and comprises conical or pyriform pots with legs, ring-stands, wide-mouthed vases and narrow-necked medium-sized pots. These are externally treated with red slip and in a few examples paintings in linear designs in red ochre. The Black-and-red Ware, comprising mostly medium to small pots, shows a variety of rims besides bowls and dishes and conical-bottomed vessels. Black-slipped ware is restricted comparatively to limited shapes like ring-stands, mini-pots, bowls and dishes.

Structurally, Megalith I with simulated anthropomorphic figure forming an integral part of one of its three concentric circle-stones is noteworthy. Although it has been thoroughly plundered of its grave chamber, measuring 1.70 X 2.15 m, one of the largest encountered so far, it is deeper, having been dug up to a depth of 1.68 m and is formed of slabs of 18 cm thick. This central chamber is surrounded by three concentric stone-circles, the innermost of which, measuring 5.6 m in diameter, is formed of huge boulders, while the middle and the outer, measuring 7.2 and 9·0 m respectively, are formed of dressed granite slabs planted vertically. The anthropomorphic figure forms part of the middle circle and is erected facing south. The figure measures 3.25 m in width and 3"25 m in height and is planted by scooping out the bed-rock to a depth of 75 cm to secure it in position besides adequate packing of *morum* on either side. Stratigraphically and structurally the installation of this monolithic anthropomorphic figure is to be attributed to the builders of this grave as a contemporaneous act.

37. EXCAVATION AT KALLERIMALAI, DISTRICT NORTH ARCOT.—The Department of Ancient History and Archaeology, University of Madras, excavated the site at Kallerimalai hilly region near the village Rajakkal in Gudiyattam Taluk under the direction of Dr K. V. Raman assisted by Drs C. Krishnamurthy, A. Swamy, S. Gurumurthy, P. Shanmugam as well as staff and students. The excavation revealed the earliest level yielding Black-and-red Ware and a few ill-fired grey ware sherds resembling the neolithic pottery, besides a solitary ground and polished stone axe. However, it is not possible to ascertain that the lowermost level represents the neolithic phase of this region since other associated materials were not encountered. The upper levels yielded pottery belonging to medieval times.

An urn-burial was encountered in one of the trenches excavated. The urn was placed on the bed-rock buttressed on all sides by hard rocky soil up to its lower half and by red *morum* at the upper half. A cluster of six (all fragments) earthen vessels was found placed close to the urn on the whitish rocky soil. The urn was found sealed by a dump of loose grey soil on the southern side over which was placed a large-sized stone slab, perhaps a cap-stone, of 5 cm thickness, almost touching a part of the mouth of the urn. The urn, globular in shape, contained fragments of bones, a skull and a few Black-and-red Ware vases like bowl, cup, etc.

Uttar Pradesh

38. EXCAVATION AT MORADHWAJ, DISTRICT BIJNOR.—The Department of Ancient Indian History, Culture and Archaeology, Garhwal University, carried out excavation at Moradhwaj

under the direction of Dr K. P. Nautiyal, assisted by Sarvashri B. M. Khanduri, D. L. Rajput, S. S. Negi, V. P. Hatwal and A. B. Joshi, besides Shri B. R. Rajput of the Survey, with a view to ascertaining the early history of the foot-hills of Garhwal besides imparting training to the students of M. A. degree course. The excavation revealed three occupational periods.

Period I *(circa* fifth'century to second century B.C.) is characterized by the occurrence of the Northern Black Polished Ware along with the associated wares such as fine grey and red. Houses built of baked bricks (sizes: 42 x 20 x 8 and 46 x 20 x 8 cm) and a mud-wall encircling the habitation were encountered.

Period II A *(circa* second century B.C. to first century A.D.) is marked by the pottery similar to the one from the other contemporary historical sites in the Ganga plains. However, particular mention may be made of a variety of sprinklers. The structures of the Period were of baked bricks (sizes: 24x22x7 and 22x15x6 cm). Besides these structural remains, a fortification-wall built over the earlier mud-wall was also traced. Among the important antiquities of the Period mention may be made of: terracotta human and animal figurines, beads, cart-wheels; copper bangles; and iron implements.

Period II B, belonging to Kushana times, is represented by typical pottery of the period. It is remarkable in the sense that the entire area might have become a thriving centre, as several houses were found to have been built all along the periphery. The excavation revealed remains of spacious houses. The bricks used were of the sizes 24 x 12 x 6 and 25 x 15 x 6 cm. Further, the excavation revealed a defence-wall, built of baked bricks set in mud mortar. It has an average width of 10 to 12 m. The most noteworthy discovery of the Period is that of a moulded terracotta figure of Buddha seated in *jnanamudra* and another moulded plaque depicting Krishna slaying the demon Keshi, both dated to the beginning of the second century A.D. Among other important finds, mention may be made of: copper bangles; iron implements; terracotta gamesmen; beads of terracotta and stone; and a gold coin of Vasudeva of the Kushana dynasty, the obverse and reverse bearing respectively king standing in profile and a goddess on a throne. The excavation also indicated that the site was abandoned after the Kushana period.

39. EXCAVATION AT HULASKHERA, DISTRICT LUCKNOW.—The Department of Archaeology, Government of Uttar Pradesh, under Shri R. C. Singh, assisted by Shri Hem Raj, carried out a small-scale excavation at Hulaskhera with a view to ascertaining the cultural sequence of the site. The excavation revealed a 5-m thick deposit, divisible into three periods.

Period I *(circa* sixth century to second century B.C.) is characterized by the occurrence of the Northern Black Polished Ware, black-and-red and red wares. It is noteworthy that the lowest deposit of 80 cm yielded black-slipped ware. The prominent types encountered are bowls, dishes and perforated vases. Among the antiquities, mention may be made of: terracotta animal figurines, vase-and pear-shaped beads; bone awls, tanged arrowheads; and ivory beads.

Period II *(circa* second century B.C. to second century A.D.) is marked by the occurrence of baked brick structures, divisible in three phases. The bricks used in the early two phases measure 43 x 24 x 7 and 38 x 23 x 5-5 cm respectively. However, the structures belonging to third phase, probably the Kushana period, are built of brick-bats and bricks of the size 35 x 23 x 6 cm. The ceramic industry of the Period is characterized by red ware of medium to coarse fabric. The Northern Black Polished Ware and black-slipped ware also occur in the early phase of the Period. The prominent types in red ware include ink-pot type lids, bowls with inturned rims, high-necked jars, inverted lids and storage jars with collared rim, etc. The noteworthy antiquities belonging to this Period include: one Kartikeya image in gold; silver punch-marked coins; copper antimony rods and coins of Vima Kadphises Kanishka and Huvishka; terracotta objects like vase-shaped beads, votive tank, flesh-rubber, potter's stamp, human and animal figurines; and bone awls.

Period III *(circa* third century to fifth century A.D.) is also represented by red ware and baked brick structures of three phases. Important among the structures encountered is a part of a brick pillar belonging to the Gupta period. The ceramic industry includes such shapes as bottle-necked sprinklers, bowls with tapering sides ending with flat base and shapeless internally thickened rims, etc. Among the antiquities mention may be made of: terracotta objects such as human figurines with frizzled locks, flesh-rubbers, potter's stamps; ivory combs; copper antimony rods; bone awls; and iron arrowheads and spearheads. An oval-shaped iron object (57 X 42 cm), consisting of seventeen bars is another important discovery of this Period.

40. EXCAVATION AT RANIHAT, DISTRICT TEHRI.—The Department of Ancient Indian History, Culture and Archaeology, Garhwal University, carried out excavation for two seasons, 1976-77 and 1977-78, at Ranihat under the direction of Dr K. P. Nautiyal, assisted by Sarvashri B. M. Khanduri, Vinod Nautiyal and S. S. Negi besides the technical staff of the Survey _ represented by Sarvashri L. Dutt, A. K. Roy, Jassu Ram and R. K. Sehgal. The objectives of the excavation was to ascertain the early history of the Garhwal region besides imparting training to the students of M. A. degree course. The excavation revealed three periods of occupation, represented by a 3·1-m thick deposit.

Period I *(circa* sixth century to fourth century B.C.) is characterized by a distinctive red ware which is glossy, fine and thin with shades varying from red to chocolate and crimson, besides a few sherds of fine grey and black-polished wares. The pottery of this period is comparable to the pre-Mauryan pottery found at Hastinapur, Sravasti, Kausambi etc. In the excavation a few floors were encountered which were made of river pebbles covered with a thick layer of sandy loam. Important finds of the period include: terracotta ram; copper ring; and iron arrowheads and needles.

Period II A *(circa* fourth century to second century B.C.) is marked by the occurrence of a crude variety of Northern Black Polished Ware along with red ware represented by shapes including rimless *handi,* miniature bowl, Ahichchhatra 10 A type, etc., similar to the ones from the historical sites in the Ganga plains. Remains of brick structures with floorings paved with bricks were also encountered in this Period. The sizes of bricks, 30 X 23 X 7.5, 22-8 X 21.5 X 5.9 and 23 X 17.5 X 7.5 cm, indicate a Maurya-Sunga horizon. A few wedge-shaped bricks suggest that such bricks were probably used in the construction of either well or barn. An important discovery, however, is that of a circular mud oven which contained burnt bones, charcoal and few burnt pieces of potsherds. Noteworthy antiquities of the Period include: terracotta animal figurines; stone beads; copper bangles; and iron arrowheads and a large number of nails. Iron seems to have been extensively used in this Period as is evident from the occurrence of large number of implements and slags.

Period II B *(circa* second century B.C. to second century A.D.) is marked by the continuation of the earlier pottery traditions, besides the introduction of thumb impressed and grooved decorations, bottle-necked sprinklers, miniature vases comparable to the ones from the central and western India. It was observed that brick-bats were used in the construction of the structures. The floors were made either of round pebbles or broken bricks and tile pieces. The use of iron continued to be a dominating feature.

Period III *(circa* sixth century to twelfth century A.D.) is represented by a pottery similar to that found in the late levels of Ahichchhatra and Hastinapur. The flooring of the structures was made of rammed clay mixed with brick pieces, stone chips and occasionally bricks robbed from the earlier levels. Structural activity is represented by several phases. One of these being associated with the construction of a temple. The floors in this phase were made of river pebbles and the walls of dressed stone slabs. This Period is marked by the discovery of two coins of the Sultanate period which places the end of the site in about twelfth century A.D.

II. EPIGRAPHY

SANSKRITIC AND DRAVIDIC INSCRIPTIONS[1]

ANDHRA PRADESH

1. Two EASTERN CHALUKYAN CHARTERS, ALURU, DISTRICT GUNTUR.—These two charters engraved in Sanskrit language and Telugu-Kannada characters, belonging to the reign of Vishnuvardhana III, were found at Aluru in Tenali Taluk. One of them, dated in his tenth regnal year (A.D. 728), records the grant of land, free from all taxes, on the occasion of *Uttarayana* in the village of Niddhanchhalu in the Vilo-(Vila?)-nadu-vishaya to Vishnudasasarma, a brahmana resident of Vatapi, belonging to Kasyapa-gofra. Satyasaraya, the son of Vishnuraja, was the *ajnapti* of the grant. The second charter is dated in the thirty-second regnal year (A.D. 750), and records the grant of Chintalapundi in Viha (Vila-nadu)-vishaya to the deity Bhimesvara of the Siva temple in Nellikudur-mahasthana as *devabhoga,* made tax-free at the instance of Vinaya-sarma; Durjjaya was the *ajnapati* of the grant.

2. CHARTERS, MOOGUTHI, DISTRICT KURNOOL.—A set of three plates with ring and seal found at Mooguthi, in Adoni Taluk, is in Kannada language and script. It belongs to the time of Nolamba-Pallava King Vira-Mahendra.

3. VIJAYANAGARA INSCRIPTION, PEDDA-HARIVANAM, DISTRICT KURNOOL.—Belonging to the reign of Vira-Sadasivadevaraya, this damaged Telugu inscription is dated in the Saka 1482, Raudri (A.D. 1561). It refers to *mahamandapalesvara* Srirangarajayyadeva-maharaju, son of *mahamandalesvara* Siddhiraju Avubalaraju who seems to have made some grants on the occasion of the solar eclipse in favour of the *Vidyan-mahajanas* of the village in the *agrahara* of Pedda-Harivanam, situated in Adavani-durga.

4. THREE CHALUKYAN INSCRIPTIONS, ALAMPUR, DISTRICT MAHBUBNAGAR.—Of the three Kannada inscriptions the first one belonging to the reign of Chalukya Trailokyamalla (Somesvara I), is dated in the Saka 982 (A.D. 1060) and records a gift of land to the deity Brahmesvara by *Perggada* Davapayya. Belonging to the same Chalukya ruler, the second inscription, dated in Chalukya Vikramavarsha 1 [•] Dumdubhi refers to the gift of lands to the same deity by the pupils of *the jiyas* (priests of the temple). The third one dated in Saka 1184 (A.D. 1262) of the time of Tribhuvanamalla (Vikramaditya VI), records the renovation of a pillar *(kambam)* of the temple of Brahmesvaradeva by Bammisetti for the merit of *Cheraku-Murari* Ketaya, *Danav-Murari* Immadi-Devaya, *Dushtarankusa* Annaya and Jagadala Marayya.

5. Two INSCRIPTIONS, KUDAVELLI, DISTRICT MAHBUBNAGAR.—One of the two inscriptions engraved on the wall of the central shrine of the Kudali-Sangamesvara temple and written m Telugu-Kannada characters of the eighth century A.D., reads Sri *Utpatipiduguekantanivasi.*

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[1] Information from: 2,17-18, 23-24, the Director, Department of Archaeology and Museums, Government of Karnataka; 6 and 10, the Director, Archaeology and Museums, Government of Andhra Pradesh; 32 and 46, the Southern Circle of the Survey; 35-36 and 38, the Director, Archaeology and Museums, Government of Madhya Pradesh; 41, Dr (Mrs) Shobhana Gokhale; 42, the Director, Tourism, Cultural Affairs, Archaeology and Museums, Government of Punjab; and the rest from the Chief Epigraphist of the Survey.

The other one, in Telugu language and characters, engraved on the doorway of the *mukhamandapa,* is dated in Saka 1646 (A.D. 1724); it records the grant of land, for having caused the erection of a pillar to Alampuri Dharmaju and also the gifts to the principal deity Sangamesvara.

6. CHALUKYAN INSCRIPTION, SAIDAPURAM, DISTRICT NALGONDA.—Dated in Saka 956 (A.D. 1034) and referring to the reign of Chalukyan king Jayasimha II, this stone inscription records the gift of the village Muppanappali in Kollipaka 7000 for the maintenance of two Jaina *Basatis* built by certain Aggalayya who bears the titles Vaidya-ratnakara, Pranacharyya and Naravaidya. The records describes the proficiency of Aggalayya in Ayurveda with particular . reference to his skill in Sastra-vaidya or treatment of diseases by surgical methods.

7. EASTERN CHALUKYAN INSCRIPTION, SRIKURMAN, DISTRICT SRIKAKULAM.—This inscrip tion, in Telugu language and characters of about twelfth century and dated in Saka 11 [']4, refers to the reign of Vishnuvardhana Vijayaditya of the Eastern Chalukyan dynasty. It records the gift of sheep for maintaining a lamp to the deity Kurmanatha by his son Somisvara on the occasion of *[uttara] yana-sankranti.*

8. EASTERN GANGA INSCRIPTION, SRIKURMAM, DISTRICT SRIKAKULAM.—This inscription in Telugu language and characters of the twelfth century, engraved on a slab on the south wall of the *mandapa* of Srikurmanatha temple, belongs to the reign of Anantavarmadeva of the dynasty and is dated Saka 1 [***]. It records the gift of 22 *Nandimalla-madas* for a lamp to the deity Kurmanathesvara by his subordinate *mahatnandalika* Chamdu, whose father's name is lost.

9. SANSKRIT INSCRIPTION, SRIKURMAM, DISTRICT SRIKAKULAM.—Engraved on a pillar of the *mandapa* of the Srikurmanatha temple, this inscription, in Sanskrit language and both in Nagari and Telugu characters of the thirteenth century, records the obeisance to the god Kurma who is described as bearing the earth on his back, goddess Lakshmi in his chest, compassion in his heart and the three words in his stomach.

10. INSCRIPTION OF REDDI KINGS, DISTRICT WEST GODAVARI.—A copper-plate charter from a village in the Palavaram Taluk, belonging to Allada Vemareddi of the Rajamundry Branch, registers the gift of the village Kadapurru renaming it as Vemavaram by Vemambika the mother of Allada Vema to her preceptor Aditya, an Aradhya Saiva, in the Saka year 1345 (A.D. 1423).

GOA, DAMAN AND DIU

11. SANSKRIT INSCRIPTION, ARVELAM, DISTRICT GOA.—Written in Sanskrit verse and box-headed variety of southern characters of the fifth century A.D., this worn-out inscription, engraved on the shaft of a *Siva-linga* installed in a cave, gives the description of a forest-region besides referring to *mahalava* and the deity Hara (obviously the presiding deity of the same temple).

GUJARAT

12. COPPER-PLATE INSCRIPTION FROM RAJASTHAN, AHMADABAD, DISTRICT AHMADABAD.—Consisting of a set of two copper plates, this charter, originally found at Jalore, District Jalore, Rajasthan, and now deposited in the L. D. Institute of Indology, Ahmadabad, is dated in

Vikrama 1160 (A.D. 1103). It records that *Rajaputra* Purnaraja, the son of *Rajaputra* Miyanpala, on whom *Maharajadhiraja* Vijayaraja had conferred the village of Vadhanavada and granted a piece of land in that village to the brahmana Rudra, the son of Mada, hailing from Sunela sthana and belonging to the Bharadvaja-gofra and three *pravaras.* The charter is written by Tejala of Gaudr-anvaya.

13. TELUGU COPPER-PLATE, AHMADABAD, DISTRICT AHMADABAD.—Belonging to the reign of Maliq Ibrahim of Golkonda this single copper-plate is in Telugu language and character. Dated in Saka 15 [60] (A.D. 1638), it records that *Komiti* Yakkamti Amkisetti, who probably misappropriated a sum of 12000 (in unspecified currency) and who was being troubled by the citizens on that account, was rescued and adopted after remitting the sum of the city adminis-tators by the members of the Ayiddhati-Pamchanana. It also refers to the gift made to the Amkisetti by the *Ayddhati-pamchananamvaru* (community of artisans). The names of coins such as *varaha, gadyana* and *mada* are here mentioned. A certain Peshini Hanunamta is described here as *Tribhuvana-bhuvananirmat-adara.*

14. MAITRAKA CHARTER, TALALA, DISTRICT JUNAGADH.—Engraved in the western variety of the southern characters and in Sanskrit language this charter, now preserved in the Junagadh Museum, belongs to the reign of *Paramabhattaraka Mahadhiraja Paramesvara* Siladitydeva III. It was issued from the victorious camp at Khetaka in the (Gupta-Vallabhi*) year 387 (300 + 8 + 7), on the eighth day of the dark fortnight of Karttika. It registers the royal grant of land (details not clear) situated in Surashtra to a brahmana (name not clear) belonging to the Bahvricha-*sakha* and Bharadvaja-gofra. The *dutaka* of the grant was the prince Dharasena and the charter was written by Varjjata (Vajrata) whose name is known for the first time from the present charter.

15. THREE COPPER-PLATE CHARTERS OF TORAMAN'S TIME, SANJELI, DISTRICT PANCH MAHALS.—These copper-plates recovered during tilling a field on the outskirts of the Sanjeli town, are now preserved in the Department ,of Archaeology and Ancient History, M. S. University of Baroda. All the charters, each made out of a single sheet with writing on both sides, are engraved in Sanskrit language and Gupta-Brahmi characters of the fourth century A.D. Of these, one charter is dated in the year 3, Srava [na] su. 2 while *Paramabhattaraka Maharajadhiraja* Toramana was ruling over the earth. If the date is referred to the Gupta era (A.D. 319-20), the charter may be dated to A.D. 322-23. It introduces *Maharaja* Bhuta as enjoying the Sivabhagapura and records certain grants made from the proceeds of sales, to the temple of the god Jayasvamin, caused to be constructed at Vadrapali by the queen-mother Viradhyika for worship and offerings to the deity.

The second charter, dated in the year 6, Jyeshtha su. 10 (A.D. 325-326) introduces *Maharaja* Bhuta as meditating on the feet of the *Paramabhattaraka* (i.e., Toramana) and addressing all the officers stationed at Sivabhagapura, and also records that Bhuta donated the villages of Tantiyaka and Amrilaka, all tax-free, to be enjoyed by the *Parivrajas* and for worship and offerings to the deity of the temple of the god Bhagavatpada caused to be constructed by the queen-mother Viradhyika. The third one is dated in the year 19, Chaitra su. 5 (A.D. 338-39) and introduces *Maharaja* Matridasa's grandson and *Maharaja* Bhuta's son *Maharaja* Matridasa as meditating on the feet of the *Paramabhattaraka* and as issuing his order from Sivabhagapura. It records the grant of a village Samgamapallika for the worship and offerings of the deity Syami-Narayanadevapadah of the temple caused to be constructed at Vadrapah by the queen Pitamahikayika.

HARYANA

16. EARLY INSCRIPTION, CHIDIYA, DISTRICT ROHTAK.—This fragmentary inscription, engraved in Sanskrit language and Kushana-Brahmi characters of the second century A.D., refers to the reign of a king *{rajan)* who is described as *Gotamiputra* and whose name, but for the initial letter *pa* is lost. It contains a reference to the royal priest *(purodhas)* whose name is lost but who is described as the son of Sivasarma, as belonging to the [Kaus] ikya-sa *gotra* and a *asakritsoma [pithin].* The ruler is obviously one of the many chieftains who are known, from their coins to have held sway in the Punjab-Haryana region during the Kushana period.

KARNATAKA

17. TAMIL INSCRIPTION, DODDA HULLUR, DISTRICT BANGALORE.—The inscription on the *adhishthana* moulding of the Isvara temple at Dodda Hullur, belongs to the Hoysala period and states that the temple was rebuilt from *upana* to *stupi.* It belongs to the Chola period.

18. GANGA COPPER-PLATES, MANNE, DISTRICT BANGALORE.—These copper plates unearthed from the field near Manne village, now preserved in the Directorate of Archaeology and Museums, Government of Karnataka, are in Sanskrit language and Kannada script of the seventh-ninth centuries A.D. All of them are issued by the kings of the Ganga dynasty, and amongst these, one belongs to Sri Vikrama (A.D. 629-54) and gives the genealogy of the dynasty from Sri Kongani Varma up to Sri Vikrama who is called Sri Vikramanka, son of Mushkaranka. It registers the grant of the village Velleri (Belleri) located near Telgili to one Bhutasharma of Kashyapa-*gotra* (pl. XLVIII A).

The other two belong to the reign of Ganga Narasimha I (A.D. 800), first one recording the genealogy of the family and registering the donation of certain lands in the village of Masakkelli (Maskal) in the Ponnudikke-vishaya (Hunnudike in Tamkur Taluk) by the king at his victorious camp in *Manyapura* (Manne). The second one registers the grant of lands in Chavattur village in the *Manya-vishaya* (Manne Division) to one Kumarasarma of *Vasishtha-kula* belonging to *Atharva-charana* (pl. XLVIII B).

19. BANA INSCRIPTION, HALEKOTE, DISTRICT BELLARY.—Belonging to the reign of Trailokyamalla *Banadhirajar* and dated in the Saka 975 (A.D. 1054), the inscription registers the gift of 12 *matter* of land to the god Kudala Mallikarjuna at Sindavura, 12 *mattar* for the *patrapavula,* 6 *mattar* for the teacher Baladeva by the king. It also records some stipulation regarding the annual payment made by the *uragamunda* to the *okkala-makkal.*

20. CHALUKYAN INSCRIPTION, KALLUKUTIGANAHALU, DISTRICT BELLARY.—The inscription belonging to the reign of Somesvara I and dated in Saka year 989 Plavanga (A.D. 1067) refers to the king's feudatory *mahamandalesvara* Revaparasa as administering over the Kallukuti and records the endowment of 5 *mattar* of land for the maintenance of Ponnayagavunda's well by Birayyagavunda and Maniyama-gavunda.

21. VIJAYANAGARA INSCRIPTION, RAVIHALU, DISTRICT BELLARY.—Dated Saka 1476, Pramadicha (A.D. 1554) and referring to the reign of Sadasivadevaraya, this inscription refers to his feudatory *mahamandalesvara* Ramarajayya, son of Srirangaraja, on whose order Timmarajayya is stated to have endowed the income from *talavarika* etc., to the *Asesha-vidyanmahajanas* of Ravihalu for the merit of the king.

22. CHALUKYA INSCRIPTION, T. RAMAPURAM, DISTRICT BELLARY.—Belonging to the reign of Jayasimha II and dated in the Saka year 944, Dundubhi (A.D. 1022), it records the installa tion of god (Ma) hadeva probably by Kambeya of Tondehal who also made a gift of land of 6 *mattar* to Balachandrajiya.

23. KALYANI CHALUKYAN INSCRIPTIONS FROM GHORTA, MUCHALAM AND DHANURA, DISTRICT BIDAR.—Of these Kannada inscriptions, one from Ghorta records the donation to god Nagaresvara while the other two registers the donation to god Rudresvara. The one from Muchalam records a grant to the god Ramalingesvara, while the fourth one, from Dhanura, records the donation of a lamp-pillar.

24. THREE INSCRIPTIONS, SRIRAMPURA, DISTRICT CHITRADURG.—These inscriptions, belonging to the Vijayanagara king Sadasivaraya, were copied from the village.

25. WESTERN CHALUKYA CHARTER, DHARWAR, DISTRICT DHARWAR.—Dated in Saka 591 (A.D. 669) and referring to the fifteenth regnal year of Vikramaditya I, this inscription in Sanskrit language and Telugu-Kannada characters, records the royal grant of the village Bhramaradala and Avuganuru in *Kuhundi-vishaya* to Kumarasvamin, son of Devasvami-dikshita and grandson of Megasvamin, of Kasyapa-*gotra*, well-versed in the four *sastras* at the behest or Nagavaradhana-Chadraditya-bhattaraka on the occasion of the worship of Vishnu on the eighth day of the dark fortnight in the month of Asvayuja.

26. KANNADA INSCRIPTIONS, CHINMELLI, DISTRICT GULBARGA.—Of the three inscriptions, engraved on stone slabs in the Mallikarjuna temple on the right bank of the Bhima river, the-one dated in the ninth regnal year (A.D. 1175) of Kalachurya king Rayamurari Sovideva, records that on his orders his subordinate *mahapradhana Senadhipati* Kallana-dandanayaka referred to as the ruler of Attinuru-80 division, his brother Sirivachcha-danadanayaka, *maha-mandalesvara* Manneya Ahavamallarsa and others granted Birajavada, a village situated in Attinuru-80 division as *sarvaya-siddhi* (free from all taxes) to Sivadevayya for the purpose of worship, offerings etc., to god Svayambhu Mallikarjundeva of Chillamela. The second, in characters of the twelfth century, records the gift of lands to the same person and for the similar purpose by the (Silahara Chief) *mahamandalesvara* Dhanasangragarasa, the ruler of Tarddavadi who was administering from fort of Allinuru, the *prabhu-gamudas* of the place (i.e. Attinuru-80) and *Heggade* Bammaya. It also records some other grants by the same chief Mallidevarasa, Ahavamalladevarasa and others made during the cyclic year Virodhi, for the purpose of worship and offerings to the same deity. The third dated in Saka 2114 (A.D. 1292), records that during the reign of the Yadava king Ramachandradeva, his subordinate *mahamandalesvara, maharajaputra* Mayidevaraneya of Vijayapura accompanied by his *ranivasa* and the officers like *srikaranas* and *pradhanas,* after bathing in the sacred river Bhimarathi at Chillamala, made a series of gifts to the above deity following the renovation of the temple.

27. CHALUKYA INSCRIPTION, KARAJGI, DISTRICT GULBARGA.—Dated in the Chalukya Vikrama year 23 (A.D. 1098), this damaged inscription records the construction of Ratnatraya-jinalaya with *uttunga-torana* and grant of land and money for its maintenance by Bhagaladevi, a queen of Chalukya king Vikramaditya VI, belonging to the Pandya family. She is described as greater than the great women of the past like Revakanimmaddi, a Ghatantaki, Attimmabbe and others for her good deeds and qualities.

28. CHALUKYA INSCRIPTION, MASAL, DISTRICT GULBARGA.—Belonging to the reign of the Chalukya king Tribhuvanamalla (Vikramaditya VI) this inscription records the grant of land,

300 *mattar* measuring in *bemkolvana kolu* to provide for the maintenance, worship, offerings, etc. at the *trikuta* temple of Mahadeva, Kesavadeva and Adityadeva at Masivala by Yuvaraja Mallikarjunadeva who was endowed with many titles. The inscription is dated in his regnal year 39 (A.D. 1114).

29. VIJAYANAGARA COPPER-PLATE CHARTERS, HALEBID, DISTRICT HASSAN.—Of the tWO charters, now preserved in the Archaeological Museum, Halebid, the one written in Sanskrit language and Nandi-Nagari characters, and dated in Saka 1308 (A.D. 1386), belongs to the reign of Harihara II. It registers the grant of land situated around the *agrahara* Pattadahali, in Sige-nadu, in the presence of Tunga and Pampa Virupaksha, to brahmanas of various *gotras* and well-versed in Vedas. The second charter in Telugu language and characters and dated Saka 1581 (A.D. 1659) of the reign of Srirangaraja (III) records a gift of land for the purpose of the deity Tiruvengalanatha, to *Bokkasamu* Kuchchaya, son of Tiruvengalaya and grandson of Venkataya of *Srivatsa-gotra,* Asvalayanasutra and Rik-sakha, by the king.

30. Two CHALUKYA INSCRIPTIONS, VALABALLARI, DISTRICT RAICHUR.—These two Kannada inscriptions belong to the reign of Vikramaditya VI. The first one dated in the Chalukya Vikrama year 20, Yuva (A.D. 1095), refers to *mahapradhana-sandhivigrahika-sarvva-dhyaksha-maha-(prachanda)-andanayaka* Mahadeva-bhattopadhyaya and registers a gift of income from taxes to the god Mulasthanadeva at the *agrahara* of Priya-Bellahara for the good offerings, perpitual lamp, music concert etc., by Kesiraja who was in charge of *Achchupannayad-adhishthana* (superintendent of the revenue from mints). The second charter, dated in the Chalukya Vikrama year 42, Hemalambi (A.D. 1117), refers to the king's feudatory *mahasamanta, piriyabenteya* Vasantanayaka and records the grant of land of 10 *mattar* measured by the *Adityadevara-gadimbada kolu* to the god Kesavadeva who was installed by Balabhaskaradeva on the occasion of *uttarayana-sankranti* for conducting the food-offerings. The gift land was entrusted to the 120 *mahajanas* of Piriyaballapala-agra/bra.

34. FIVE KANNADA INSCRIPTIONS, KELLAPUTTIGE, DISTRICT SOUTH KANARA.—These Kannada inscriptions engraved in characters of the eleventh-twelfth century refers to the setting up of memorial stones *(vira-sasvatam)* for the two chiefs Sebya-kella and Payadare-kella of the Kella family of Puttige by persons (names given) belonging to the different lineages *(ball).*

MADHYA PRADESH

32. KALACHURI COPPER-PLATES, DHUBELA, DISTRICT CHHATARPUR.—This copper-plate, written in Sanskrit language and Nagari script, originally found at Umaria, District Panna and now kept in the State Archaeology Museum, Dhubela, records the grant of the villages Bhathi, situated in Vadigamva-pattala, Valahadi and Amilavada in Khamtapattala to a number of brahmanas by *Ranaka* Kumarapala, a feudatory of the king for the merit of his wife Mokha. The charter was written by *arthalekhi* Kesava and engraved by *sutradhara* Sihada. It is dated in the Kalachuri era 944 (A.D. 1193) and belongs to the reign of Kalachuri king Vijaya-Simhadeva.

33. UCHCHAKALPA COPPER-PLATE CHARTER, JABALPUR, DISTRICT JABALPUR.—This charter, issued from Uchchakalpa was originally discovered from Uchchara, in District Satna and is now deposited in Rani Durgavati Museum, Jabalpur. Engraved in Gupta characters and Sanskrit language, it records the royal grant of the village Kalabhikundaka divided into several shares to the members (names given) belonging to four *varnas* by *Maharaja* Jayanatha,

son of *Maharaja* Vyagraha and his queen Ajjhitadevi. This charter is written by Sandhivigrahika Manoratha the son of Bhogika Varahadinna and grandson of *Bhogika* Phalgudatt-amatya and is dated in the Gupta era 182 (A.D. 501-502).

34. KALACHURI COPPER-PLATE, JHULPUR, DISTRICT MANDLA.—This copper-plate inscrip tion, in Sanskrit language and Nagari script, belonging to the reign of Vijayasimhadeva, now preserved in the Mandla Museum, records the grant of a village Matami of Jaulipattala to Pt. Vidyadhar Sharma of Vajasaneya caste and great grandson of Bhuvana Sarma, grandson of Pahul Sarma and son of Janardan Sarma by the *Maharajadhiraja* Vijayasimhadeva on the occasion of birth-rite of his son Trailokyamalla. It is dated in (Kalachuri) Samvat 949 (A.D. 1197).

35. COPPER-PLATE OF KALACHURI RULER, VIJAYASIMHA, UMARIA, DISTRICT PANNA.—The copper plates dated to Kalachuri year 944 refers to the grant of three villages to several brahmanas by Ranak Kumarapala in the reign of Vijayasimha. The full genealogy of the Kalachuri rulers is also given here.

36. KALACHURI COPPER-PLATES, SIMARIA, DISTRICT REWA.—Two charters, engraved in Sanskrit language and Nagari characters, are now preserved in the Rani Durgavati Museum, Jabalpur. One of the charters is dated in Kalachuri-Samvat 807 and belongs to the reign of *Maharaja* Karnadeva. It records the grant of village Vyasand in Godavahi Pattala by *Maharaja-dhiraja* Karnadeva to the brahmanas and pandits residing in the temple of Sankaravisvavara at Sankaradevipura.

37. PARAMARA INSCRIPTION, BHOPAL, DISTRICT SEHORE.—This inscription, originally discovered at Bamai, in District Raisen, and now preserved in the Birla Museum, Bhopal, is engraved on a stone pillar and belongs to the reign of the Paramara king Jayasimha-deva (Jayavarman II). It is dated in Vikrama 1308 (A.D. 1251) and records that Raja Talakasimha caused to be made a temple of Talakesvara at the village Vrahma and made a grant of 400 *drammas* for the *udyapana* ceremony. The inscription is composed by *Pam* Mahana-sarman and engraved by Ubhayadeva.

38. _ COPPER-PLATE OF BUDHAGUPTA'S TIME, SHANKARPUR, DISTRICT SIDHI.—Engraved in Sanskrit language and Brahmi script of *circa* fifth century A.D., this plate is dated in the Gupta era 166 (A.D. 486) and belongs to the time of Budhagupta. It records the grant of village Chitrapalli to a brahmana Gosvamin of the *Kaust-gotra* by *maharaja* Harivarman, son of *maharaja* Vijayavarman and queen Sarvasvamini, grandson of *maharaja* Gitavanman and daughter's son of *maharaja* Satana, the last-mentioned one appearing to be a Saka king.

39. INSCRIPTION OF A NAGA RULER, BESNAGAR, DISTRICT VIDISHA.—This epigraph is engraved on a stone slab found in the course of excavation at Besnagar and now deposited in the Survey's Circle Office at Bhopal. Written in Sanskrit language and Siddhamatrika characters of about fifth century A.D., it is dated in the year 5 and mentions Vijayanaga, his son *Maharaja {name* lost) and few more descendants. Besides, it contains reference to the members of a Pratihara family of whom the name Bhutimitra and Dronamitra are preserved. Towards the end the blessings of the Sarva (i.e. Siva) are invoked. The inscription is important as it reveals the existence of a Naga ruling family and a feudatory Pratihara family in the Vidisha region in the fifth century A.D.

MAHARASHTRA

40. RASHTRAKUTA CHARTER, BHINDON, DISTRICT AURANGABAD.—This charter, now preserved in the Department of History and Ancient Indian Culture, Marathawada University, Aurangabad, is engraved in Sanskrit language and northern characters of the ninth century, belongs to the reign of Kakkaraja *alias* Pratapasila who is described as belonging to the Maha-Rashtrakut-anvaya. It records that the feudatory ruler Svamiraja, son of Durgaraja, after obtaining the consent of his overlord, made a grant of the village Chichapalli to the brahmana Bhana-bhatta, the son of Kongasarma and a Kanva.

41. COMMEMORATIVE INSCRIPTIONS, KANHERI, DISTRICT THANA.—Two inscriptions discovered near Kanheri are datable palaeographically to *circa* A.D. 500-650 and throw light on the monastic institution there. It is for the first time that one gets the evidence of the teacher's tradition in the Buddhist caves of western India. In the second inscription the name of a hero named Sami, who was Andhakavira, is mentioned.

PUNJAB

42. KHAROSHTHI INSCRIPTION, SANGHOL, DISTRICT LUDHIANA.—A fragmentary stone inscription in Kharoshthi script, which seems to bear a date, was discovered in surface exploration.

TAMIL NADU

43. COPPER-PLATE CHARTER, MADRAS, DISTRICT MADRAS.—This copper-plate inscrip tion, in Sanskrit language and Grantha characters is dated Saka 1418 (for 1408 A.D. 1489) in the third regnal year of Parakramapandya and records the grant of the village of Kovaneri renamed Timmaraja-samundram in Karunilkkudi-nadu into 37 shares to several brahmanas for the merit of Timmaraja, the younger brother of Ramaraja of the Chandra-vamsa described as the king's friend. The draft was composed by *Kaviraja* Sabhapati and written by Adaikkalam-kattar, a *sthapati.*

44. TAMIL INSCRIPTION, MADRAS, DISTRICT MADRAS.—This Tamil inscription engraved on an iron drum-like object without the leather shield at either end was discovered at Settipulam, District Thanjavur, and is now deposited in the Government Museum, Madras. It contains a verse in Tamil characters of about the thirteenth century stating that the golden drum of Pulikkaduvan Makali, a gift of the Saligar of Karikalasolapuri, bore the name Pulikkaduvan.

45. BRAHMI INSCRIPTION, MUDALAIKULAM, DISTRICT MADURAI.-—This Tamil inscription in Brahmi characters of the first century B.C. engraved on the sloping roof at the entrance into a small cavern on the eastern face of the western ridge near Vikkiramangalam, records its making by the *Perayam* (for Perayam) of Sempirai-ur.

46. INSCRIPTIONS IN CHENGAM AND POLUR TALUKS, DISTRICT NORTH ARCOT.—Ten inscrip tions engraved on the walls of the temples were noticed at Attippadi, Perunduraimpattu, Sadakuppam, Serpattu, Ten-Mudiyanur, Thiruvadattanur, Udaiyarkuppam, Unnampalaiyam, Valavachchanur and Varagur. These inscriptions in the Grantha script and Tamil characters, are ascribable variously to a period ranging in dates from the tenth to the eleventh century A.D. Further, inscriptions, in Tamil script and language, dating from thirteenth to sixteenth centuries were also noticed at Irumbili, Kasthampadi and Tovarandal in the Polur Taluk.

47. SANSKRIT INSCRIPTION, VENGUNAM, DISTRICT NORTH ARCOT.—Engraved on a slab set up near a temple at the bottom of the hill, this Sanskrit inscription in Nagari, Telugu and Grantha characters, records in a verse composed by Venkatargamakhi, son of Raghunathasuri of Atreya-go/ra the demise of Ratna at Dhavalachala (Venkunram) and the erection of a memorial *mandapa* for the travellers as a token of devotion to her by her son king Kanhoji, a descendant of Vitthala.

48. HERO-STONE INSCRIPTION, KARUMANTURAI IN CHINNAKKALRAYAN HILL, DISTRICT SALEM.—This epigraph in Tamil characters of the fourteenth-fifteenth century A.D. and now preserved in the Government Museum, Salem, records the death of Kovuchchangan in Karuvanturai, on account of his fight with the bull and refers to the erection of the (inscribed) stone by the son (name lost) of Gangan.

49. PANDYA INSCRIPTION, PARUTTIPALLI, DISTRICT SALEM.—Dated in the fourteenth regnal year of Sadaiyavaraman Sundarapandya and engraved in the characters of the thirteenth century, the inscription is now preserved in the Government Museum, Salem. It records the gift of wet and dry lands as *Kudiningatiruvidaiyattam* in Agarapuram to provide for the offerings during a festival in the month of Masi to the deity Vedanayagapperumal of Tirunarayanapuram in Karai-nadu by the *nattar* of Puvaniyanadu at the instance of the *nattavar* of Periya-nadu.

50. CHOLA INSCRIPTION, DARASURAM, DISTRICT THANJAVUR.—Engraved on the *prakara* wall of the Airavatesvara temple, this inscription dated in the fifth regnal year of Rajadhiraja II (A.D. 1170-71) records the assignment of one half of the lands under the *ur-kanakku-kani* and *koyir-kanakku-kani* of the Pallipadi temples in Rajaraja-chaturvedi-mangalam to Aludaiyan and his descendants for the maintenance of accounts as *kanakkuk-kani* of the following sepulchral (pallipadai) temples, Rajagambhira-Isvaram, Bhuvanamulududaiyal-Isvaram, Tribhuvana-mulududai-Isvaram, Elulagamulududai-Isvaram, Ulagudai-mukkokkilandi-Isvaram, probably named after Rajaraja II and the queens of the Chola family.

ARABIC AND PERSIAN INSCRIPTIONS[1]

ANDHRA PRADESH

1. INSCRIPTION, DISTRICT CHITTOOR.-—The record states that tomb of Miran Majid, the martyr was built through the efforts of the Basit and the active help of Galib in A.H. 1191 (A.D. 1777) during the rule of (the Carnatic Nawwab) Muhammad AH when the *jagir* of Chitur was held by Abdus-Samad.

2. INSCRIPTION OF ASAF JAHIS, PARAGTUR, DISTRICT MAHBUBNAGAR.—This inscription of the time of Nizam Ali Khan Asaf Jah II, dated in A.H. 1209 (A.D. 1794), records the construc tion of a mosque by Muhammad Amin Khan Arab.

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[1]Information from Dr Z. A. Desai, Director (Epigraphy). Dr Desai assisted by Sarvashri N. M. Ganam, M. F. Khan, S. S. Husain and Dr M. Y. Quddusi and Shri M. I. Quddusi found, copied, examined and reported on two hundred and twenty-nine inscriptions during the year, except item nos. 9 and 12, the impressions of which were received from the Director, Department of the Archaeology and Museums, Government of Karnataka, Mysore and the Chief Epigraphist of the Survey, respectively. Of these, important ones are noticed here.

GUJARAT

3. FRAGMENTARY INSCRIPTIONS, JAMNAGAR, DISTRICT JAMNAGAR.—A fragmentary inscription in somewhat degenerate *Kufi* is stored in the State Museum, and it refers to one Khatib, son of Qaqu (?), son of Daud. On palaeographical ground it may be dated to about twelfth-thirteenth century A.D. Another fragmentary record from the same Museum and also written in *Kufi.* script but palaeolographically assignable to the eleventh-twelfth century A.D. appears to be an epitaph.

4. EPITAPH, TARAPUR, DISTRICT KHEDA.—It records the death of Shaikh Umar, son of Jalal, in A.H. 983 (A.D. 1575).

5. INSCRIPTION OF THE SULTAN OF GUJARAT, HIMMATNAGAR, DISTRICT SABAR KANTHA.—An epigraph of Mahmud Shah assigns the construction of 'a noble and auspicious place' (by which probably a mosque is meant) to Mubarak, son of Taj, son of Hasan, son of Sher with the surname Sherani, the Fief-holder *(Wajhadar)* of the town *(Qasba)* of Muhammadabad *alias* Diyadar, in A.H. 875 (A.D. 1471).

6. INSCRIPTION OF SULTAN OF GUJARAT, DHARANGADHRA, DISTRICT SURENDRANAGAR.—This inscription records the construction of a mosque to Munir Sultani in A.H. 840 (A.D. 1437).

7. EPITAPHS, VADODARA, DISTRICT VADODARA.—Of the three epitaphs in a mosque originally belonging to Cambay, one was meant to mark the grave of Hasan, son of Daud, son of Ibrahim, son of Nudah, son of Sulaiman, son of Ali, son of Abdullah who died in A.H. 818 (A.D. 1415), the second that of Khwaja Adam, son of Shah Muhammad, son of Yaqub, son of Jafar who died in A.H. 901 (A.D. 1495) and the third one, of Abu Bakr, son of Ibrahim, son of Ahmad, son of Qasim in A.H. 904 (A.D. 1499).

KARNATAKA

8. MUGHAL INSCRIPTION, DODDABALLAPUR, DISTRICT BANGALORE.—This inscription refers to the capture of the fort of Balapur which had a large quantity of artillery *(top-khana)* from the Marahta (Maratha) chief Sambha, son of Siva in the thirty-second regnal year corresponding to A.H. 1100 (A.D. 1688) of Aurangazeb by Qasim Khan, *Faujdar* of the District *(Sarkar)* of Karnataka attached to the Province *(Suba)* of Daruz-Zafar ('Abode of Victory') Bijapur. It also records that in the thirty-fourth regnal year, it was placed in charge of Shaikh Shah Muhammad al-Faruqi, a descendant of (the famous 13th century saint) Shaikh Faridud-Din Masud Chishti Ajodhani and an inhabitant of city *[Balada)* of Badayun, situated in the province of Shahajahanbad *alias* Delhi, who got this stone removed in the same year from a ruined temple situated at a distance of two *kroh* (i.e. *kos)* from the said Bhonsla fort further down (?) for (some) building (?). The writing in Indian (Hindi i.e. Kannada) script was inscribed by Madan Mohan Singh and the one in Persian by Shaikh Muhammad Hafiz (cf. *Epigraphia Carnatica,* Doddaballapur, no. 31; Mysore Gazetteer, V, Bangalore 1930, p. 163).

9. INSCRIPTION OF THE SULTANS OF MYSORE, GANJAM NEAR SERINGAPATNA, DISTRICT MANDYA.—It records the grant of a piece of land adjacent to Chankal (or Changal) in the *taluq* of Rahmantnagar (?), measuring 500 by 500 cubits, for the graveyard of the Muslims in A.H. 1207, Mauludi 1220 (A.D. 1792) by Tipu Sultan. It also states that the land was placed under the trusteeship of Miyan Banda Shah Darwish.

MADHYA PRADESH

10. INSCRIPTION OF AURANGZEB, CHAINPUR, DISTRICT WEST NIMAR.—A bilingual fragmentary epigraph of Aurangazeb records the construction of a step-well for his own merit by a local chief Bhav Singh (mentioned as Maharana in the Nagari text).

11. INSCRIPTION OF AKBAR'S TIME, KASRAWAD, DISTRICT WEST NIMAR.—This inscription refers to Akbar's having passed through the place on his way to Dakan (Daccan) in A.H. 1008 (A.D. 1599) and again on his way back, after his conquest of the Dakan and Khandesh a year later. The missing portion contained the name of the well-known noble man and the scribe of the record, Mir Muhammad Masum Nami.

MAHARASHTRA

12. MISCELLANEOUS INSCRIPTION, DISTRICT AHMADNAGAR.—This undated and damaged inscription on a gun in the District Historical Museum, Ahmadnagar, records that it was manufactured for Nawwab Buzurg Ummid Khan (son of Aurangazeb's maternal uncle Shaista Khan). The persons mentioned as being engaged in its manufacture include Ujjal Bhatt, Udaji Power, Buddhu Shah and a couple of others whose names are illigible.

ORISSA

13. INSCRIPTION OF AURANGZEB'S PERIOD, BALASORE, DISTRICT BALASORE.—The record assigns the construction of a mosque in the time of Aurangazeb in A.H. 1084 (A.D. 1673) by the *Faujdar* of the place (name erased) on the site of the temple of Shri Chandi, which was set fire by a mob of Faqirs with the help of Talib Faqir in A.H. 1079 (A.D. 1668).

14. FARRUKH SIYAR'S INSCRIPTION, BHADRAK, DISTRICT CUTTACK.—An inscription of Farrukh Siyar, dated in A.H. 1126 (A.D. 1714), was found here.

15. AURANGZEB'S INSCRIPTION, CUTTACK, DISTRICT CUTTACK.—This inscription pertains to the time of Ikram Khan, the governor of the province of Katak (Cuttack) and records the construction of the mosque by the latter's wife Shahzada Begamjiu and son (?) Mahyiu'd Din (cf. *Indian Archaeology* 1976-77—*A Review,* p. 67).

16. INSCRIPTION IN STATE MUSEUM, BHUBANESWAR, DISTRICT PURL—This record of the time of the British refers to the setting up of the epigraphical tablet under the orders of Nawwab Governor General Bahadur as a token of the generosity of the Late Maharaja Sukhmoy Rai Bahadur of Calcutta who had donated to the government Rupees one hundred and fifty thousand for the construction of 'this public road' and of bridges thereon.

RAJASTHAN

17. GROUP OF EPITAPHS, BARI, DISTRICT BHARATPUR.-A large number of epitaphs of high Afghan officials who died m the fifteenth and sixteenth centuries, mostly of Afghan stock including some ladies were found here. These decased include a lady, name not mentioned

include a lady, name not mentioned but described as the Rabia (a great lady-saint) of the Age (died A.H. 846-A.D. 1442), Bibi Ashrafi Khatun (A.H. 866-A.D. 1462), Raju, son of Abdur Razzaq (A.H. 870-A.D. 1466), Sayyid Ali (A.H. 874- A.D. 1469). Iqbal Khan (A.H. 875-A.D. 1471), Bibi Lahri (A.H. 876-A.D. 1471), Firuz Khan (A.H. 880-A.D. 1475), Khan-I-Ali Daud Khan (A.H. 880-A.D.

1476), Bibi Raji (A.H. 887= A.D. 1482), Malik Sodak (?), Sayyid Mallu, Miyan Daulat Khan and Sayyid Baig (A.H. 890=A.D. 1485), Miyan Muhammad (A.H. 892=A.D. 1487), Miyan Shams Khan (A.H. 894=A.D. 1489), Sayyid Jalal (A.H. 897=A.D. 1492), Miyan Khund Khani (A.H. 921=A.D. 1515), Bibi Khunda Arasta and (her husband) Masnad-i-Ali Mubarak Khan (A.H. 923=A.D. 1517) (pi. XLIX A-B), Bibi Khassu (A.H. 926=A.D. 1520), Khun (Khan ?) Jahan (A.H. 939= A.D. 1532), Khawass Khan (A.H. 978=A.D. 1570), Miyan Ilahdad Karrani (?) (A.H. 987=A.D. 1580), Alam Khan, son of Rustam Khan (A.H. 993=A.D. 1585) and Bibi Bakhtbaland (year not given).

18. INSCRIPTION OF THE LODIS, BARI, DISTRICT BHARATPUR.—An inscription of Sikandar Shah records the construction of a mosque and a tomb in A.H. 915 (A.D. 1510) by Bibi Khunda Arasta, wife a Mansad-i-Ali Mubarak Khan, son of Iqbal Khan, and endowed the village, whose name reads like Damalgadh, which was handed over after some time by Jalal Khan, son of Mubarak Khan, by the order of the king with the stipulation that Friday prayers and *Khutba* (sermon) will be conducted in the mosque and the expenditure on oil, lighting and free-kitchen in the mosque and the tomb will be met out of it (pl. XLIX C).

19. MUGHAL INSCRIPTION, BARI, DISTRICT BHARATPUR.—An inscription on referring to the reign of Jahangir, dated in A.H. 1027 (A.D. 1617), assigns the construction of a mosque to Hamza, son of Husain, vegetable-seller *(sabzi-furush),* a resident of Nasirabad.

20. INSCRIPTIONS OF THE SAYYIDS, BARI, DISTRICT BHARATPUR.—This undated inscription records the construction of a painted and decorated dome (i.e., domed step-well) for the com fort of the public towards the end of the reign of Mubarak Shah, by Ulugh Qutlugh Azam Masnad-i-Ali (Mubarak Khan), son of Khurram Khan, son of Iqbal Khan at the sugges-tion of Muzaffar, (son of) Mansur, the Collector *(Shqdar)* of Fathpur.

A bilingual inscription from the same place records the construction of the fort *(Hisar)* of the town *(Qasba)* Fatehpur by Khan-i-Azam Khaqan-i-Muazzam Majlis-i-Ali Azam Khan, son of Mubarak Khan, son of Khurram Khan, son of Iqbyal *(sic.)* Khan for the protection of the Muslims, during the reign of Muhammad Shah in A.H. 848 (A.D. 1444). The *Nagari* version, dated in v.s. 1501, gives the place name as Badinagar.

21. INSCRIPTION OF HUMAYUN, SIR MATHURA, DISTRICT BHARATPUR.—It records the construction of a mosque by Muhtaram Baig in A.H. 945 (A.D. 1538) and also refers to his subordinate Gokal Das.

22. INSCRIPTION OF SHAHJAHAN, SIR MATHURA, DISTRICT BHARATPUR.—An inscription of Shahjahan dated A.H. 1056 (A.D. 1646) from the place refers to the reconstruction of an old dilapidated mosque, names Baqi Khan as the fief-holder *(jagirdar),* Kunjbihari and Purkh(sh)ottam as the Revenue Official *(Amil)* and Yar-Baig as the *Kotwal.*

23. INSCRIPTION OF THE LAST MUGHAL EMPEROR, FATEHPUR-SHAIKHAWATI, DISTRICT SIKAR.—This inscription of the last Mughal emperor Sirajud-Din Bahadur Shah II, records the construction of a mosque under the supervision of Yaru, son of Azim (of the) Sisodia (clan), by Najmud-Din who describes himself as a descendant of the saint Sultanut-Tarikin (Sufi Hamidud-Din of Nagaur) in A.H. 1269 (A.D. 1853). It also mentions two masons Ibrahim and Mirana Bakhsh.

24. MISCELLANEOUS INSCRIPTIONS, FATEHPUR-SHAIKHAWATI, DISTRICT SIKAR.—One of the inscriptions records the construction of a palace for his son Daulat Khan by Nawab Alif

Khan in A.H. 964 (A.D. 1557). It was composed and inscribed by Habibullah Bahlim Munshi. Another epigraph from the same place assigns the construction of a well in A.H. 972 (A.D. 1566) during the time of Diwan Sardar Khan Qiyam Khani entitled Alif Khan.

UTTAR PRADESH

25. INSCRIPTION OF SHAHJAHAN, KURSI, DISTRICT BARABANKI.—Dated A.H. 1063 (A.D. 1652), it records the construction of a mosque by Aqa Dilawar, when the jagir-holder of the place was Mir Muhammad, a descendant of the Imams.

26. MISCELLANEOUS INSCRIPTION, SARTHRA, DISTRICT BARABANKI.—It states that a well was built in A.H. 1166 (A.D. 1752-53) by a wet-nurse *(dai)* of Ray Partap Singh, Moliya (?) by name.

27. INSCRIPTION OF AURANGZEB'S TIME, KOTRA, DISTRICT JALAUN.—It records the construction of a well by Sayyid Muhammad Said in A.H. 1100 (A.D. 1689) during the reign of emperor Aurangzeb.

28. INSCRIPTIONS OF SHAHJAHAN, KOTRA, DISTRICT JALAUN.—Two almost identical inscriptions records the construction of a mosque by Sayyid Chandan and his son Sayyid Wali through the efforts of Sayyid Ibrahim, the Qadi, in A.H. 1059 (A.D. 1649). It was when the Kotwal was Daulat Qadar composed by Shah Muhammad, the secretary *(munshi)* (of the famous noble) of Abdullah Khan Firuz Jang.

III. NUMISMATICS AND TREASURE TROVE[1]

ANDHRA PRADESH

1. GOLD COINS OF LATE MUGHAL RULERS, DISTRICT ADILABAD.—Ninety-one gold coins of later Mughal rulers from Nirmal Taluk were acquired under the Treasure Trove Act.

2. UNCUT DIAMONDS, DISTRICT ANANTAPUR.—Three uncut diamonds were acquired as treasure trove finds.

3. MUGHAL GOLD COINS, DISTRICT KARIMNAGAR.—Twelve gold coins of the Mughal rulers were acquired under the Treasure Trove Act.

4. VISHNUKUNDIN COPPER COINS, DISTRICT KARIMNAGAR.—Two hundred and sixty-two copper coins, including the issues of the Vishnukundins, from Huzurnagar Taluk, were acquired as treasure trove finds.

5. PRE-AND EARLY SATAVAHANA COPPER COINS, KOTALINGALA, DISTRICT KARIMNAGAR.—One hundred and forty coins, including the issues of the rulers of pre-Satavahana dynasties such as Sunga and Kanva represented respectively by Samagopa and Kanvaya and early Satavahana rulers, including the founder of the dynasty Simuka Satavahana, were acquired as treasure trove finds. The coins of the last-mentioned king have come to light for the first time.

6. ASAF JAHI GOLD COINS, DISTRICT MEDAK.—Eight issues of Afzal-ud-Daulah and four of Mir Mahboob Ah Khan were acquired under the Treasure Trove Act.

7. MISCELLANEOUS GOLD OBJECTS AND COINS, DISTRICT VISHAKHAPATNAM.—Seven gold objects, including an image of Lakshmi, cup-shaped coin and rings of various sizes were acquired under the Treasure Trove Act. Three hundred and fifteen coins of British India along with a broken copper container were acquired as treasure trove finds from the Palasa Taluk. Moreover, one hundred and nineteen gold coins issued by the Mughal rulers came from Salur Taluk as treasure trove finds.

8. ASAF-JAHI GOLD COINS, DISTRICT WARANGAL.—Thirty-eight issues of Afzal-ud-Daulah and forty-six of Mir Mahboob AH Khan, along with a copper container were acquired under the Treasure Trove Act from the Mahabubabad Taluk.

KARNATAKA

9. GOLD COINS AND PAGODA, KANKANWADI, DISTRICT BELGAUM.—Forty-six coins *{varahas)* issued by Ikkeri Sadasiva Nayaka of Keladi (A.D. 1530-67) and one *pagoda* issued by Haidar Ali (A.D. 1761-82) and one defaced coin were found as treasure trove.

[1] Information from : 1-8, the Department of Archaeology and Museums, Government of Andhra Pradesh; 9-13, the Department of Archaeology and Museums, Government of Karnataka; 14-20, the Department of Archaeology and Museums, Government of Madhya Pradesh; 21-22, the Department of Tourism, Cultural Affairs, Achaeology and Museums, Government of Punjab; 23, the Delhi Circle of the Survey; and 24-33, the Department of Archaeology and Museums, Government of Rajasthan.

10. COPPER COINS OF BAHAMANI RULERS, HANAGANDI, DISTRICT BIJAPUR.—Eight hundred and twenty coins issued by various rulers such as Muhammed Shah II (A.D. 1378-97), Mahmood Shah (A.D. 1440-58) and Ibrahim Adil Shah II (A.D. 1580-1627) of Bahamani dynasty were acquired as treasure trove finds.

11. VIJAYANAGARA GOLD COINS, BURJA, DISTRICT CHIGKMAGALUR.—Twenty-three *varahas* and five half *varahas,* issued by Krishnadeva-raya (A.D. 1509-29), Sadasiva-raya (A.D. 1542-70) and Tirumala-raya (A.D. 1570-71), of the Vijayanagara dynasty, were received as treasure trove finds.

12. GOLD-PLATED COPPER COINS, HOSAHOLALU, DISTRICT MANDYA.—Thirteen coins, of which twelve with Uma-Mahesvara on the obverse and a legend *Krishna-raya* on the reverse, and the other one with Lakshminarayana on the obverse and the above-mentioned legend on the reverse, were acquired as treasure trove finds.

13. LEAD AND COPPER COINS, BANAVASI, DISTRICT NORTH KANARA.—Two lead coins issued during the third century B.C. (?) by a Satavahana ruler and two copper coins issued by East India Company were received as treasure trove finds.

14. PUNCH-MARKED COINS, KOPPAL, DISTRICT RAICHUR.—A hoard of five thousand five hundred and thirty-four punch-marked coins of various shapes such as circular, square and rectangular, having symbols different from those on the Amaravati hoard, was found in a copper vessel (pi. L A) bearing inscription *Chantasa* in the Brahmi characters of the second-third century A.D. It was acquired as a treasure trove find.

MADHYA PRADESH

15. GOLD COINS OF KALACHURI RULERS, KERA, DISTRICT BILASPUR.—A hoard of one hundred and three coins, issued by Jajalladadeva, Prithvideva and Ratandeva of the Kala churi dynasty, was found at Kera.

16. GOLD COINS, CHIKHALDA, DISTRICT DHAR.—Five gold coins bearing the names Alla-ud-Din Khilji and Gyas Shah Tughlaq I and one more coin bearing a legend *al sultan ullaha Ml mansoor* on the reverse (pl. L B) and *Kalima* on the obverse (pl. LC) were found at Chikhalda.

17. KALACHURI GOLD COINS, JARGAWA, DISTRICT PANNA.—A hoard of twenty-two coins of Gangeyadeva of Kalachuri dynasty was found at Jargawa.

18. SILVER PUNCH-MARKED COINS, JAMRAGHI, DISTRICT RAIGARH.—The hoard consisted of two hundred and four silver punch-marked coins was found at Jamraghi.

19. KALACHURI GOLD COINS, DUGARIA, DISTRICT SEONI MALWA.—Forty-two gold coins of Gangeyadeva was found at Dugaria in a hoard.

20. MUGHAL COINS, UJJAIN, DISTRICT UJJAIN.—A hoard of coins issued by Akbar and Alamgir II and minted from Lahore and Akbarabad, was found at Ujjain.

21. SILVER PUNCH-MARKED COINS, BESNAGAR, DISTRICT VIDISHA.—A hoard of one thousand nine hundred and sixty-four silver punch-marked coins (pl. LI) is reported to have been found at the Triveni site at Besnagar.

PUNJAB

22. COINS, SANGHOL, DISTRICT LUDHIANA.—Two Huna coins were discovered in good condition.

23. COINS, BRASS, DISTRICT PATIALA.—A few coins of Gondophernes were discovered from the ancient mound.

RAJASTHAN

24. COPPER COIN, SABORA, DISTRICT BHARATPUR.—A weathered copper coin of the medieval period bearing the date A.H. 1120 on the obverse and *zarab* on the reverse was found.

25. SILVER COINS, DISTRICT JAIPUR.—Nine silver coins of Kumaragupta, six of Sher Shah, one of Shah Alam, seven unidentified medieval coins, three hundred eighty-three of the rulers of the Delhi Sultnate and four hundred and sixty-five issues of princely-states were acquired as treasure trove.

26. SILVER COINS, CHAK.SU, DISTRICT JAIPUR.—Thirty-four silver issues of the Mughals were acquired under the Treasure-trove Act.

27. COPPER COINS, GAVALI, DISTRICT JAIPUR.—Three hundred and twenty-nine copper coins of bull and horsemen type of eleventh-twelfth century were acquired under the Treasure-trove Act.

28. COPPER COINS, CHANDRAVATI, DISTRICT SIROHI—TWO hundred and forty-four issues of the local rulers were received by the Government Museum, Abu, as treasure trove find.

29. COPPER-PLATE GRANT, CHANDRAVATI, DISTRICT SIROHI.—Two grants of the Paramaras of Abu were discovered and acquired as treasure trove.

30. SILVER COINS, KASINDRA, DISTRICT SIROHI.—A hoard of Indo-Sassanian issues was received as treasure trove.

31. COPPER COINS, RAIRH, DISTRICT TONK.—Twenty-seven copper coins of the local rulers viz., Vapu, Vachgosh, Mitras and Malavas were found as treasure-trove.

32. SILVER COINS, DISTRICT UDAIPUR.—Forty-one coins of the Mewar house were acquired through purchase for the Chittaurgarh Museum. These coins bear the legend *chitrakuta udaipur* on the obverse and *dosti london* on the reverse.

33. PUNCH-MARKED COINS, AHAR, DISTRICT UDAIPUR.—Four punch marked coins were discovered.

IV. OTHER IMPORTANT DISCOVERIES

ANDHRA PRADESH

1. LOWER AND MIDDLE PALAEOLITHIC TOOLS, MEGALITHS, EARLY MEDIEVAL TEMPLES, SCULPTURES, APSIDAL TEMPLE AND INSCRIPTIONS, DISTRICT CUDDAPAH.—Shri D. Hanumantha Rao of South-eastern Circle of the Survey, discovered an extensive Early and Middle Palaeolithic sites on the slopes of Yerrakondalu hill on the western side of Kallamalla village in Kamalapuram Taluk. The lower Palaeolithic tools consist of handaxes and cleavers, made on fine sandstone.

On the eastern side of Mekalabalayyapalle village and on the slopes of Yerrakondalu hill, an extensive megalithic site containing hundreds of cairn-circles of various diameters ranging from 3 to 14 metres was located. At Chidipiralla village, 5 km from Kamalapuram in the same Taluk, two groups of early medieval temples, loose sculptures and inscriptions were found. An interesting apsidal temple, named Mulasthanesvara was noticed at Pottapi in Siddhavattam Taluk.

2. ANCIENT SITE, DISTRICT EAST GODAVARI.—During the course of an exploration Dr K. Krishna Murthy, assisted by Sarvashri D. Hanumantha Rao and G. V. Sreenivasa Rao of the South-eastern Circle of the Survey, discovered an ancient site at Bommaru, locally known as 'Sanyasula Metta', 5 km from Rajahmundry on the Rajahmundry-Tanuku Road, yielding red ware bowls, dishes, finials etc.

3. BUDDHIST STUPA, DISTRICT GUNTUR.—Sarvashri P. N. Kamble and D. Hanumantha Rao of South-eastern Circle of the Survey, discovered a cluster of Buddhist stupas on the top of a red sandstone hill near Yerrapalem in Mangalagiri Taluk.

4. MEDIEVAL TEMPLES AND LOOSE SCULPTURES, DISTRICT KHAMMAM.—Sarvashn D. Hanumantha Rao and G. V. Sreenivasa Rao of South-eastern Circle of the Survey, discovered a large-sized dilapidated medieval temple and loose sculptures near Vedantapuram village in Palavancha Taluk. The temple consists of a *garbhagriha, ardhmandapa* and a *mahamandapa.* Among the loose sculptures which are also in broken condition, a red sandstone sculpture of Mahishasuramardini, standing in *tribhanga* pose having eight hands, is noteworthy.

5. NEOLITHIC AXE, DISTRICT KURNOOL.—A rare type of ground stone double-edged axe with sawed sections and longish socket, transversely cut for the wooden haft was picked up from the ancient mound at Kudavelli by Shri G. Lakshminarayana of the Headquarters Office of the Survey. The tool type is a rare example, akin to a 'pick-axe' but is of dolerite with polished edges, revealing its prolonged use.

6. MEDIEVAL FACTORY SITE, DISTRICT MAHBUBNAGAR.—From the available materials it is concluded that it must have been a iron factory site datable to late medieval period, where tools were prepared, as evidenced by the occurrence of plenty of iron slags and ash.

7. MEGALITHS, DISTRICT NALGONDA.—Shri D. Hanumantha Rao of South-eastern Circle of the Survey, discovered an extensive megalithic sites at Takadlapalle and Gollapalle in Devarakonda Taluk.

8. EARLY HISTORICAL SITES, DISTRICT NELLORE.—Shri I. K. Sarma of Temple Survey Project, Southern Region, of the Survey, assisted by Sri P. Sitarama Rao, a local doctor, discovered an extensive early historical mound at Duvvuru, a village 20 km north-west of Nellore on the right bank of the river Pennar.

The site near Kotesvaralayam is nearly six acres in extent and the steeply cut earthen sections, nearly five metre thick, yielded: sherds of Black-and-red, red-slipped, Rouletted and Red Polished Wares; ruined brick structures; foundational courses of a fortification; and a series of silver, lead and copper coins. Most remarkable were coins, which by themselves afford a good sequence, the foremost among them being of silver punch-marked types.

9. MEGALITHS, DISTRICT RANGAREDDY.—Dr K. Krishna Murthy assisted by Shri G. V. Sreenivasa Rao of the South-eastern Circle of the Survey, explored an extensive megalithic site at 28/4 km on the Hyderabad-Vijayawada National Highway.

10. NEOLITHIC SITE, DISTRICT SRIKAKULAM.—A neolithic site at Karlem village in District Srikakulam was explored by Dr K. Krishna Murthy assisted by Shri D. Hanumantha Rao of South-eastern Circle the Survey. The surface collection includes profuse quantity of red ware of sturdy, thick fabric represented by such form as lipped bowl, urn with flaring rims, vases, etc.

BIHAR

11. MIDDLE PALAEOLITHIC TOOLS, EARLY HISTORICAL SITE, DISTRICT BHAGALPUR.—R. S. Bisht assisted by Sarvashri, D. P. Sinha and A. N. Roy of the Mid-eastern Circle of the Survey, discovered two scrapers from Mander hills, a fragmentary panel depicting Krishna and Gopalakas at Patharghatta, and a mound yielding sherds of N. B. P., grey and red wares and crystal beads at Fauzdari village.

12. EARLY HISTORICAL SITE, KOTHIA, DISTRICT CHAPRA.—Shri D. P. Sinha of the Mid-eastern Circle of the Survey, discovered an early historical site, yielding sherds of N. B. P. Ware and its associated red wares and the remains of brick structures of early centuries of the Christian era.

13. CHALCOLITHIC SITE, RAVELGANJ, DISTRICT CHAPRA.—Shri D. P. Sinha of the Mid-eastern Circle of the Survey, collected microliths and bone objects besides chalcolithic pottery from Ravelganj, the types represented being dish-on-stand, lipped bowls, ring bases and jars.

14. EARLY HISTORICAL SITE, DISTRICT GAYA.—Shri Naseem Akhtar of Gaya Museum located an early historical site on the left bank of the river Son, near the village Baidrabad, about 40 km to the west of Jahanabad. The site yielded sherds of the N. B. P. Ware along with grey, black-slipped, black-and-red and red wares.

The most important discovery from the site included a stone sculpture of standing eight-armed dancing Ganesa belonging to the Pala period.

15. SEWERAGE SYSTEM, DISTRICT MUZAFFARPUR.—A unique sewerage system was discovered at Katra about 1 km to the west of *garh*. The main drain-pipe was made of baked bricks—four bricks, forming a circular hole. Besides, other sewers made of baked clay pipes interlocked with each other and connected with the main drain were also found.

16. MIDDLE PALAEOLITHIC TOOLS, CYCLOPEAN WALL AND EARLY HISTORICAL SITE, DISTRICT NALANDA.—Shri R. S. Bisht assisted by Sarvashri, Vijendra Singh and D. P. Sinha of the Mid-eastern Circle of the Survey collected Middle Palaeolithic tools from the gravel bed of the outside Banganga the southern gate of old Rajagriha. Besides an extensive site yielding N. B. P. and the associated wares, beads of semi-precious stones, and glass bangle, microliths were also located. At Jethian near Rajgir, remains of cyclopean wall continuing further westwards along the summits of the northern as well as southern ranges of the hills were traced. It was also observed that both the inner and outer feet of the hills right from the Giryale to Topovana and Chaleraghati were also secured with massive defences; all vulnerable points, giving access to the valley, were found to have been securely plugged.

17. TERRACOTTA TEMPLES, DISTRICT SANTHAL PARGANA.—Sarvashri D. P. Sinha and A. N. Roy of the Mid-eastern Circle of the Survey, recorded a group of terracotta temples at Maluti, about 60 km east of Dumka and found in all eighty-two temples ascribable to the seventeenth century A.D. The temples were found to have been decorated with beautiful terracotta plaques depicting scenes from the Ramayana, Krishna-/z7a, Mahishasuramardini in addition to other carved floral patterns along with inscriptions in the Bengali characters of the seventeenth century A.D.

GUJARAT

18. HARAPPAN SITE, BHIMNATH, DISTRICT AHMADABAD.—Shri K. D. Tripathi of the Western Circle of the Survey, located a Harappan site at Bhimnath, 15 km west of the Tehsil headquarters of Dhandhuka in Ahmadabad and collected pieces of perforated jar, dish-on-stand, terracotta cakes, goblets, animal figurines micaceous red-ware etc.

19. HARAPPAN SITE, LAKHAVAD, DISTRICT BHAVNAGAR.—Shri K. D. Tripathi of the Western Circle of the Survey, discovered a Harappan site at Lakhavad, 2 km east of the village Knivad, and picked up pieces of perforated jar, dish-on-stand and terracotta objects.

20. HARAPPAN SEAL, DISTRICT KUTCH.-—The Department of Archaeology, Government of Gujarat, discovered a Harappan seal bearing Harappan characters at Gadhwalivadi near the village of Khirasra in Nakhatrana Taluk.

21. VARAHI, MODHERA, DISTRICT MAHESANA.-Dr B. L. Nagarch of the Western Circle of the Survey, discovered a stone sculpture of Varahi, datable to *circa* tenth century A.D. at Modhera.

22. ROCK SHELTERS, DISTRICT SABAR KANTHA.—Eighty-two protohistoric (?) and Early Historic rock-paintings were discovered by the Department of Archaeology, Government of Gujarat from the following places.

Village	*Rock shelter Sr. No.*	*No. of paintings*	*Description*
Gambhirpura	14	1	*Stupa* with Chhatra Yashti
-do-	15	2	*Stupas*
-do-	16	3	*Stupa*
-do-	17	1	Horse rider
-do-	18	1	*Stupa* and some Brahmi characters
Idar	4	5	Symbols, trident, arrow, arch etc.

Luloda	6	9	Arrow, arch, animals and symbols
-do-	7	8	Palam impression
-do-	8,9	6	Floral & leafs superimposed
-do-	10	3	-do-
-do-	11	4	-do-
-do-	12 & 13	13	-do-
Sapawada	1	6	Three birds and horse, etc.
-do-	2	9	Man, bird, dog, elephant rider, etc.
-do-	3	9	Symbols, sun, moon, bison, etc.
-do-	5	2	Straight and cross lines

The paintings are drawn with red and white pigments. The paintings depicting stupa may be belonging to the fourth-sixth century A.D. while the remaining ones seem to be of chalcolithic periods on stylistic grounds.

23. MEDIEVAL SCULPTURES, BRIDGE AND MICROLITHIC SITE, DISTRICT SURAT.—Shri S. S. Nayak of the Western Circle of the Survey, noticed ruins of a temple and sculptures assignable to the tenth-eleventh century A.D. at Kalavyara, memorial stones at Kelkui, a Siva temple and a few sculptures assignable to *circa* seventeenth century A.D. and a bridge of the same period at Shahanpur and a microlithic site at Wankla in the Vyara taluk.

24. MEDIEVAL SCULPTURES, DISTRICT VADODARA.—Dr B. L. Nagarch and Shri P. K. Trivedi of the Western Circle of the Survey, discovered sculptures of Indra, Kubera, Ashtavasus, Siva and Ganesa at Makani. These sculptures are assignable to *circa* eleventh century A.D. Shri P. K. Trivedi recorded an image of a Jaina *tirthankara* at Pipal Sat assignable to *circa* thirteenth century A.D. A number of sculptures, including Nandi, *Siva-linga,* Vishnu, commemorative pillars and a headless female-deity, all assignable to *circa* tenth-fifteenth century A.D., were noticed by him in the vicinity of the same village.

HARYANA

25. MEDIEVAL TEMPLE AND INSCRIPTION, DISTRICT AMBALA.—The Department of Archaeology, Government of Haryana, discovered an extensive temple site of medieval period at village Thakurdwara. An early medieval stone *prasasti,* comprising ten lines of inscription in Brahmi script, palaeographically ascribable to eleventh-twelfth century A.D. has also been found along with a stone image of Trimurti.

26. ANCIENT SCULPTURE, DISTRICT GURGAON.—The Department of Archaeology, Government of Haryana in the course of further exploration in the District discovered a red sandstone Sunga pillar at village Hathin in Palwal Tahsil. The pillar is in Barhut style and depicts a *yaksha* standing on a kneeling dwarf. The nativity scene of lord Buddha related with the dream of queen Maya has been beautifully sculptured on the medallion of the pillar. A short inscription in Brahmi character was also seen engraved on the other side of the railing: the inscription reads as *padayikintu.*

27. SUNGA RAILING PILLAR AND BRAHMANICAL SCULPTURES, DISTRICT GURGAON.—The Department of Archaeology, Government of Haryana found another red sandstone railing

pillar depicting *yaksha* figure standing on an animal. Various Brahmanical stone sculptures belonging to the ninth-tenth century A.D. were also collected from Kasan.

28. SCULPTURE, DISTRICT MAHENDRAGARH.—The Department of Archaeology, Government of Haryana, collected a stone image of Trimurti from village Budholi.

29. HISTORICAL REMAINS, DISTRICT SIRSA.—The Department of Archaeology, Government of Haryana, located historical remains at Bagwala, Bahudeen, Choti Dhani, Manju Khera, Mahinder-ki-Shani, Monali, Narela Khera, Putelidaha, Sikandarpur and Titnakhera.

JAMMU AND KASHMIR

30. SCULPTURE, DISTRICT BARAMULLA.—During the course of clearance work carried out by the North-western Circle of the Survey, around Siva temple at Fatehgarh, a life-size three headed stone statue of Siva, measuring 1.76 X 0.57 m and datable to sixth century A.D. was discovered.

31. MEDIEVAL TEMPLE, DISTRICT JAMMU.—An impressive and intact Siva temple, made of *lakhouri* bricks, datable to the early eighteenth century was discovered at Nad.

32. BUDDHIST CLAY TABLETS, DISTRICT LEH.—Shri S. L. Shali of North-western Circle of the Survey, found unbaked clay tablets, representing figures of Buddha, Bodhisattava, Tara, Manjusri and Maitreya in an ancient stupa known as Tessru, near Leh, in Ladakh.

KARNATAKA

33. MESOLITHIC ROCK PAINTINGS, DISTRICT BIJAPUR.—More than fifty painted shelters are discovered at two sites by Dr Yashodhar Mathpal of the Department of Archaeology, University of Poona and Mr Erwin Neumayer during a joint expedition. These sites, locally known as Aregudda and Hiregudda, are situated between the famous Chalukyan art centres of Badami and Pattadkal. The importance of the sites lies in their rock paintings, which are generally thought to be confined to the Vindhyan sandstone formations in central India. Raichur, Badami and Bellary areas are also known for the rock bruishings done on the rough faces of the loose granite boulders. These bruishings are associated with the Neolithic cattle-keepers living on the tops of the granite hills in the second millennium B.C.

At Aregudda and Hiregudda, the paintings depict masked hunters chasing wild animals (viz. deer, antelopes and cattle). Spears and arrows used by the hunters are shown barbed and tipped with microliths. Besides, there are designs with maze patterns and fish. One ol' the paintings at Hiregudda shows a wild buffalo/gaur being followed by a man with an antler as weapon in his right hand. The paintings executed in dark red colour have become partially faded and covered by the white drawings of humped oxen and chariots. These latter drawings are similar in subject matter and style with those of the bruishings and drawings of the neolithic times. Microliths and chalcedony nodules are also found on the floors of the painted shelters and the surrounding areas. Rock paintings are also seen in two shelters situated close to the rock-cut temples in the Badami town.

34. LATE CHALUKYAN TEMPLE AT BELUR, DISTRICT BIJAPUR.—Shri G. C. Chauley of the Mid-Southern Circle of the Survey, noticed a temple consisting of *mukhamandapa, navaranga,* and *garbhagriha* with carved pillars of late Chalukyan period, dedicated to Vishnu.

35. SCULPTURE IN SRINGERI TALUK, DISTRICT CHIKMAGALUR.—Shri S. P. Nainar, of the Mid-Southern Circle of the Survey, found a beautiful sculpture of Ganapati at Maland. It is a peculiar figure with two hands without ornaments and crown. It is one of" the earliest sculptures of Ganapati found in Karnataka. Besides, a few hero-stones so far unnoticed were also discovered by him.

36. EARLY HISTORIC TEMPLES, DISTRICT NORTH KANARA.—Shri S. P. Nainar, of the Mid-Southern Circle of the Survey, noticed four ancient temples of which three have been completely damaged. The surviving temple is beautifully decorated with Saivite sculptures, *dikpalas* along with a few nude sculptures suggesting some influence of the Tantric cult, which is rare in this part of the country. The temples may belong to the eighth-tenth century A.D.

37. HOYSALA TEMPLE AND SCULPTURES IN SHIKARIPUR, DISTRICT SHIMOGA.—Shri G. C. Chauley, of the Mid-Southern Circle of the Survey, discovered an hthierto unnoticed Siva temple of the Hoysala period at Bellagavi village besides a colossal Jaina image along with a few brahmanical loose sculptures.

38. HERO-STONES, DISTRICT TUMKUR.—–Shri K. V. Rao of the Mid-southern Circle of the Survey, discovered a large number of hero stones of the Ganga period besides a beautiful Anjaneya temple.

39. EARLY HISTORICAL SITE, HONNUDIKER, DISTRICT TUMKUR.—Shri B. Raja Rao, of the Mid-Southern Circle of the Survey, explored an early historical site of the Ganga period at Jalagaradibba. He collected sprinklers, bowls, spouted vessels of red ware along with tiles, a terracotta figurine of the animal ram, a miniature bronze seated Ganesa having four hands, few hero-stones and remains of brick structures of the same period. He also noticed a temple dedicated to Janardana, belonging to the Chola period.

40. HOYSALA TEMPLE AND SCULPTURES, TIPTUR, DISTRICT TUMKUR.—Shri G. C. Chauley, of the Mid-Southern Circle of the Survey, discovered three ancient temples of southern style at Pankajanahalli village. At Kibbanahalli village an underground temple consisting of a *mukhamandapa* and *garbhagriha* was noticed. Several loose sculptures of Vishnu, Ganesa, Mahishasuramardini, Veerabhadra and *nandi,* belonging to the Hoysala and Vijayanagara periods, were found here.

KERALA

41. DOLMENS, DISTRICT CALICUT.—Shri M. Raman Namboodiri of the Southern Circle of the Survey, noticed dolmens at Edakallu hill near village Nenmeni.

MADHYA PRADESH

42. VISHNU TEMPLE, DISTRICT JABALPUR.—During the clearance work carried out by the Department of Archaeology and Museums, Madhya Pradesh, remains of a brick temple of Vishnu, belonging to *circa* fifth century A.D. were exposed at Dithwara, 16 km north of Katni. The temple consists of a platform and measures roughly 20 X 15 m. Three sizes of bricks have been used in it.

43. SCULPTURES, DISTRICT MANDASOR.—Nearly one thousand sculptures collected from Hingalajgarh, Bhanpura Tehsil, have been brought to the Central Museum, Indore

(pi. LII A and B), by the Department of Archaeology and Museums. The earliest sculptures which are in low relief may be assigned to the second-third century A.D. Out of the total collection, only two sculptures, viz., Mahishasuramardini and a *yogini* belong to the Gupta period, fifteen to the Pratihara and the remaining ones to the Paramara periods.

44. BRAHMANICAL SCULPTURES, DISTRICT NARSIMHAPUR.—Sarvashri A. P. Sagar and V. N. Gupta of the Central Circle of the Survey, discovered a number of medieval brahmanical sculptures at Murlipondi.

45. ROCK-PAINTINGS, SAMUNDARAJA, PREMSHAHI, DISTRICT NARSIMHAPUR.—Sarvashri A. P. Sagar and V. N. Gupta of the Central Circle of the Survey, discovered a painted rock-shelter, depicting hunting, war and dancing scenes in red and white pigments. Some of the paintings were also found superimposed.

46. PALAEOLITHIC TOOLS, NEOLITHS AND MEDIEVAL FORT IN DISTRICT RAIPUR.—During the preliminary exploration of the Upper Mahanadi valley in the Chhattisgarh region of the District, undertaken by Shri C. Krishnan on behalf of the Department of Archaeology and Museum. Government of Madhya Pradesh, stone implements made on quartz, neolithic and chalcolithic sites, besides the remains of a medieval fort in Dhamtari Tehsils, were located.

47. BRAHMI INSCRIPTION, SONARI, DISTRICT RAISEN.—Shri Sharief Beg of the Central Circle of the Survey, during the course of debris clearance of the Stupa 1 at Sonari, discovered two stone slabs containing fragmentary inscriptions in early Brahmi characters {*circa* second century B.C.). The inscriptions read *guhapatino dhamapala ja vasiye* and *ma nihapaja (si) ey* meaning Dharmapala, the householder, resident of Manikapaja.

48. ROCK PAINTINGS AND INSCRIPTIONS, DISTRICT REWA.—Sarvashri S. S. Gupta, J. S. Dubey, A. J. Nambhiraju and O. B. Khobragade, under the guidance of Dr K. D. Banerjee, of the Prehistory Branch of the Survey, explored rock-paintings at Hanumana with a view to establishing the chronology of the rock-paintings normally assigned to the prehistoric period and discovered seventy-two painted rock shelters. This year twenty-one of them in the vicinity of Hanumana have been studied. The paintings, in almost all the shelters of this group, show animals and human beings, done in red ochre. The human forms are depicted as engaged in such acts as dancing, hunting, fighting, etc. A significant discovery is the find of three painted inscriptions in Devanagari script in pigment.

49. BRAHMANICAL SCULPTURES, TEONDA, DISTRICT VIDISHA.—Shri V. N. Gupta of the Central Circle of the Survey, discovered a number of medieval sculptures.

50. FORTRESS, TEONDA, DISTRICT VIDISHA.—Shri V. N. Gupta of the Central Circle of the Survey, noticed a ruined fortress belonging to *circa* fifteenth-sixteenth centuries A.D.

MAHARASHTRA

51. EARLY HISTORICAL SITE, MANDAD, DISTRICT KOLABA.—Dr S. Nagaraju of Nagarjuna University, located near village Mandad in Mangaon Taluk an ancient site yielding black-and-red and red-polished wares ascribable to the early centuries of the Christian era. The site situated just on the edge of the Mandad branch of the Janjira creek and appears to have been an important place. It is likely that this is the town Mandava referred to in several of the Kuda inscriptions as the place from which a family of Mahabhojas hailed.

52. ANCIENT GAVE, NILGUND, DISTRICT KOLABA.—Dr S. Nagaraju of Nagarjuna University, reported a single-celled cave with a small open court in front on a hill about 300 m east of Nilgund, a village located about 4 km north-west of Mangaon.

53. ROCK-CUT CAVES, JIVADAN-VIRAR, DISTRICT THANA.— Dr S. Nagaraju of Nagarjuna University, discovered on the Jivadan Hill, located about 3 km east of the Virar railway station, three more ancient caves.

MANIPUR

54. LATE MEDIEVAL, TEMPLE, DISTRICT IMPHAL.—Shri L. M. Wahal of the Eastern Circle of the Survey, noticed a brick temple built on *panchayatana* plan at Wangkhei Leikai, a village, on Imphal-Burma road.

PUNJAB

55. MEDIEVAL SCULPTURES, DISTRICT PATIALA.—At Kalyan 6 km from Patiala on Patiala-Nabha road, some fragmentary sculptures in sandstone of Adinatha (pl. LIII A) and complete sculpture of a Jaina *tirthankara* of *circa* eleventh-twelfth century A.D. were found by the Depart ment of Archaeology, Government of Punjab.

RAJASTHAN

56. METAL IMAGE OF PARSVANATHA, BANSWARA, DISTRICT BANSWARA.—Shri P. K. Trivedi of the Western Circle of the Survey, recorded an inscribed metal image of Parsvanatha dated Samvat 1623 (A.D. 1566).

57. MEDIEVAL BRAHAMANICAL SCULPTURES, TEMPLE, AND COMMEMORATIVE PILLARS, NANGAWAN, DISTRICT BANSWARA.—Drs R. N. Mehta and C. Margabandhu, assisted by Shri P. K. Trivedi, noticed images of Siva, Nirrita, Andhakasura fixed in the walls of modern temple and three commemorative pillars, all assignable to *circa* twelfth-thirteenth century A.D., at Nangawan in Bagidora Tehsil. Shri P. K. Trivedi discovered a medieval temple, images of inscribed Vishnu and Vaishnavi, datable to *circa* twelfth-thirteenth century A.D., besides numerous commemorative pillars in and around the vicinity of the village.

58. MEDIEVAL SCULPTURES, MENAL, DISTRICT CHITTAURGARH.—Dr B. L. Nagarch of the Western Circle of the Survey, discovered medieval sculptures of Siva, Siva-Parvati, Varahi, Ganesa, Surya and *saptamatrikas* datable to *circa* twelfth century A.D.

59. BRAHMI INSCRIPTION, DISTRICT KOTA.—Shri Giriraj Kumar reported two painted Brahmi inscription from Kalaji-Ki-Kui, about 3 km from Darah and Kanyadeha which refers to *Ripisen* and *Tisa* respectively.

60. MEDIEVAL SCULPTURES, ATRI, DISTRICT KOTA.—Dr B. L. Nagarch of the Western Circle of the Survey, discovered medieval Hindu sculptures at Atru. Important among them were sculptures of Indra and Indrani, *dvadasadityas, ekadasarudras,* Uma-Mahesvara, Gaja-Lakshmi, Lakshmi-Narayana, Vaishnava, *dvara-palas* and Krishna-*lila* scenes. These sculptures are datable to *circa* eleventh century A.D.

61. MEDIEVAL TEMPLES, BITU, DISTRICT PALI.—Shri R. Pathak of the Western Circle of the Survey, during the course of his exploration noticed: (i) Siva temple datable to eleventh

century A.D. at Bitu, Rana, Sivana, Bhanwari and Dayalpur, (ii) two inscriptions dated A.D. 964 and 1561 at Dundhi and (iii) medieval temples of Jaina and Hindu pantheons at Balotra and Kher.

62. EARLY HISTORICAL SITE, HARSAMPUR, DISTRICT SIKAR.—Shri P. K. Trivedi of the Western Circle of the Survey, discovered a historical site at Bewan, near Harsampur and noticed pottery, unfinished stone pillars and stone-ring, besides broken sculptures assignable to the medieval period.

63. POST-GUPTA AND PRE-MEDIEVAL SCULPTURES, KALYANPUR, DISTRICT UDAIPUR.—Shri P. K. Trivedi of the Western Circle of the Survey, recorded a number of sculptures assignable to *circa* sixth-eighth century A.D. at Kalyanpur near Rishaohadeo.

TAMIL NADU

64. LATE CHOLA TEMPLE, DISTRICT CHINGLEPUT.—Shri Shivananda Venkat Rao, of the Southern Circle of the Survey, noticed in the village Kilakattur, a late Chola temple dedicated to Siva locally known as Agastesvarar.

65. LOOSE SCULPTURES, DISTRICT CHINGLEPUT.—Shri Shivananda Venkat Rao, of the Southern Circle of the Survey, in the course of his exploration noticed a sculpture of Ganesa *(circa* seventeenth-eighteenth century A.D.) and a damaged sculpture of *tirthankara* (eleventh-twelfth century A.D.) in Arapakkam. An excellent late Chola sculpture of Vishnu with consorts was also noticed near Kilperamanallur village.

66. EARLY HISTORIC POTTERY, DISTRICT COIMBATORE.—Pottery of Black-and-red and Russet-coated Wares were picked up from the mound closer to the Pittisvarasvami temple at Perur.

67. HERO-STONES, DISTRICT NORTH ARCOT.—Two hero-stones with inscriptions and carvings showing a person riding on a horse holding sword and shield in hands were noticed near Kunnathur and Kalasamudram in Polur Taluk. They seem to belong to eleventh-twelfth century A.D.

68. MEDIEVAL TEMPLE, DISTRICT NORTH ARCOT.—A temple dedicated to Devi and assignable to Vijayanagara period was noticed near the village Padavedu in Polur taluk.

69. NEOLITHIC, MEGALITHIC ASSEMBLAGES AND SCULPTURES, DISTRICT NORTH ARCOT.—Shri I. K. Sarma of the Temple Survey Project, Southern Region of the Survey, found megalithic Black-and-red, red-slipped and Russet-coated Painted Wares, besides a few handmade coarse grey and black-burnished grey wares at Kailasagiri, Arumbhavimalai and Gangalamahadevi. At the first mentioned site, neolithic ground stone axes and grinders were found, while the last-mentioned site yielded a sarcophagi in a cut gravel section which indicated an urn-burial site.

Shri Hanumanthappa Telagu of the Southern Circle of the Survey, during the course of his exploration in Chengam Taluk noticed two masonry ponds both built up with fine dressed ashlar stones, one near Kilravandavadi and the other near Chinniyampettai. The interesting feature of the masonry tank is the presence of beautiful sculpture in low relief depicting erotic and hunting scenes including those from the epics on the inner face of the parapet. On stylistic grounds all of them are ascribable to the Nayaka period.

UTTAR PRADESH

70. COPPER VESSELS AND MEDIEVAL POTTERY, NAGLA DEVJIT, DISTRICT AGRA.—Sarvashri K. P. Poonacha and S. K. Lekhwani, of the Northern Circle of the Survey, noticed copper vessels and iron objects, besides sherds of glazed ware and red-slipped ware, datable to the medieval period at Nagla Devjit situated on the left bank of river Yamuna about 10 km east of Agra.

71. MEDIEVAL SCULPTURE, LAKHAMANDAL, DISTRICT DEHRA DUN.—While on a routine visit, Dr Arun Kumar of the Northern Circle of the Survey, discovered two early medieval sculptures of Ganesa kept in a courtyard about a kilometer north of the protected monument.

72. GUPTA SCULPTURES, FAIZABAD, DISTRICT FAIZABAD.—Dr Arun Kumar of the Northern Circle of the Survey, discovered an early Gupta Siva-head in sandstone in an orchard in the heart of the town.

73. OCHRE COLOURED WARE AND EARLY HISTORICAL SCULPTURES, KANNAUJ, DISTRICT FARRUKHABAD.—In the fields to the west of Kannauj town near the old bank of the river, Dr Arun Kumar of the Northern Circle of the Survey, discovered sherds of the O. C. P. spread over a total area of 0-80937 hactares. However, the density was found more in the northern half of the area towards the river. He further noticed a late Kushana stone sculpture representing Mahishasuramardini (pl. LIII B) fixed to the outer side of a pillar of a modern temple.

74. ANCIENT MOUND, BIRPUR, DISTRICT GHAZIPUR.—Dr B. Nath of the Mid-eaterns Circle of the Survey, noticed a large mound at Birpur on the northern bank of the Ganga yielding black-and-red and grey wares and brahmanical sculptures.

75. OCHRE COLOURED POTTERY, KAMALAPUR AND MUJAHIDPUR, DISTRICT HARDOI.—In course of the re-examination of the reported sites of the copper hoards, Dr Arun Kumar of the Northern Circle of the Survey, noticed O. C. P. sherds in the fields at Kamalapur and Mujahidpur.

76. MEDIEVAL SCULPTURES, BHERAMPUR, DISTRICT KANPUR.—While inspecting the so-called fort mound at Bherampur, near Bhimsen Railway Station, Dr Arun Kumar of the Northern Circle of the Survey, discovered a number of brahmanical sculptures, ascribable to the tenth century A.D. (pl. LIII C), lying in a heap on the platform of a modern temple to the south of Bherampur.

77. OCHRE COLOURED POTTERY, DEOTI, DISTRICT LUCKNOW.—In the course of the re-examination of the sites of copper hoards, Dr Arun Kumar of the Northern Circle of the Survey, discovered a few O. C. P. sherds from the neighbouring fields.

78. EARLY MEDIEVAL SCULPTURES, DWARKHANDESHWAR TEMPLE, DISTRICT RAE BARELI.—Shri C. B. Misra and Dr Arun Kumar of the Northern Circle of the Survey, noticed early medieval sculptures, representing *matrikas,* flying *vidyadharas, ganas* and other celestials kept in one of the subsidiary shrines of the Dvarakhandesvar temple situated about 22 km from Lalganj Baiswara, on Lalganj-Bhojpur Road.

79. EARLY HISTORIC POTTERY, KURALI, DISTRICT SAHARANPUR.—Shri C. P. Singh of the Northern Circle of the Survey, collected fragments of grey ware from a mound situated at Kurali in District Saharanpur. The site also yielded sixteen silver coins of the Indo-Sassanian types as well as medieval pottery.

80. NEOLITHIC TOOLS, DISTRICT UNNAO.—Shri K. K. Tripathi of Sagar University discovered a neolith at Daudhiakura.

WEST BENGAL

81. PALA AND SENA PERIOD SCULPTURES, DISTRICT BANKURA.—Shri B. Bandyopadhyay of the Eastern Circle of the Survey, noticed medieval sculptures of Lokesvara, Vishnu, Mahishasuramardini, and Jina at Salda and Molbana.

82. HISTORICAL AND LATE HISTORICAL POTTERY, DISTRICT BANKURA.—Shri B. Bandyopadhyay of the Eastern Circle of the Survey, noticed black polished, black-and-red, grey and late historical wares at Bhogaldih, Dakshinbar Gokulnagar, Lokpur, Jaykrishnapur, Molbana, Salda, Thakurpur and Uttarbar.

83. LATE MEDIEVAL TEMPLES, DISTRICT BANKURA.—Shri B. Bandyopadhyay of the Eastern Circle of the Survey, noticed late medieval temples of Ratna and Chata type at Chatrakrishnanagar, Dakshinbar, Gokulnagar, Jaykrishnapur, Kashipur, Kuchiakol, Madhabbati, Molbana, Salda, Shyamnagar, Shukjora and Uttarbar.

84. PALA SCULPTURE IN DISTRICT WEST DINAJPUR.—Shri L. M. Wahal of the Eastern Circle of the Survey, noticed Pala sculpture and other architectural members at Banagarh.

85. EARLY HISTORICAL SITE, HASNAN, DISTRICT HOOGHLY.—Shri B. Bandyopadhyay of the Eastern Circle of the Survey, noticed an Early Historical site at Hasnan. The site has earlier yielded Gupta gold coins also.

86. LATE MEDIEVAL TEMPLE, DISTRICT HOOGHLY.—Shri L. M. Wahal of the Eastern Circle of the Survey, noticed two brick temples of Chala and Ratna type at Tribeni.

87. SENA SCULPTURE, DISTRICT JALPAIGURI—Shri L. M. Wahal of the Eastern Circle of the Survey, noted the existence of an image of Mahishasuramardini at Alipur Duar.

88. HAMAM AT ADINA, DISTRICT MALDA.—Shri L. M. Wahal of the Eastern Circle of the Survey, noticed a brick-built *hamam* of the late mediaeval period, locally known as Khazena.

89. LATE MEDIEVAL TEMPLE, DISTRICT 24 PARGANAS.—Shri L. M. Wahal of the Eastern Circle of the Survey, noticed remains of the Chala and Ratna type of temple at Khardah.

V. RADIOCARBON DATES

Radiocarbon dates' presented in the following pages were determined at the Physical Research Laboratory, Ahmadabad and the Birbal Sahni Institute of Palaeobotany, Lucknow. The dates[2] are based on radiocarbon half-life value of 5730 ± 40 years. For conversion into B.G./A.D. scale, 1950 is the base year. The sites[3] are arranged Statewise and alphabetically. All the samples were pretreated with hydrochloric acid. Rootlets were handpicked wherever present.

ANDHRA PRADESH

1. DHULIKATTA, DISTRICT KARIMNAGAR

BS-117. Historical level; wood charcoal; depth 55 cm. Sample no. DKT/1/76.	1965±100 (15 B.G.)
BS-118. Historical level; wood charcoal; depth 2.25 m. Sample no. DKT/2/77.	227O±1OO (320 B.C.)
BS-119. Historical level; wood charcoal; depth 15 cm. Sample no. DKT/3/77.	2020±95 (70 B.G.)

2. PEDDABANKUR, DISTRICT KARIMNAGAR

BS-67. Histrocial level; wood charcoal; Locus : Sector II, Division 81, layer 2; depth 65 cm.	1975±110 (25 B.C.)
BS-68. Historical level; wood charcoal; Locus: Sector I, Division 74, layer 2; depth 75 cm.	1995±95 (45 B.C.)

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[1]Samples with PRL nos. are contributed by Dr D. P. Agrawal and Kumari Sheela Kusumgar of the PRL and the samples with BS nos. are contributed by Sarvashri G. Rajagopalan and B. Sekar of the BSIP. For further details of the sample, the submitting organizations may be contacted.

[2]The dates are not corrected for any 14c/12c variations.

[3]Samples submitted by : 1-3, the Director of Archaeology and Museums, Government of Andhra Pradesh, Hyderabad; 4, Shri S. N. Rao, North-eastern Hill University, Shillong; 5, Shri P. N. Kaushik, Hissar; 6, 8-10, the Deccan College Post-graduate and Research Institute, Pune; 7, the Archaeological Survey of India; 11, the Department of Tourism, Cultural Affairs, Archaeology and Museums, Government of Punjab, Chandigarh; and 12, Professor B. B. Lai of the Indian Institute of Advanced Study, Simla.

3. POLAKONDA, DISTRICT WARANGAL

BS-97. Megalithic period; wood charcoal; depth 87 cm. Sample no. PKD/1/77.	2100±95 (150 B.C.)
BS-98. Neolithic period; wood charcoal; depth 1-15 m. Sample no. PKD/2/77.	3350±120 (1400 B.C.)

ASSAM

4. MARAKDOLA, DISTRICT KAMRUP

BS-42. Neolithic culture (?); wood charcoal; Locus: Trench III; depth 50 cm. Sample no. 1.	680±95 (A.D. 1270)

HARYANA

5. AGROHA, DISTRICT HISSAR

BS-113. Historical level; charred rice grains (associated with Indo-Greek coins from pit); depth 6 m.	1390±100 (A.D. 560)

KARNATAKA

6. CHENNUR, DISTRICT GULBARGA

BS-79. Mesolithic Age (?); sample probably representing food debris found on surface along with Mesolithic artefacts.	40,000

MAHARASHTRA

7. DAIMABAD, DISTRICT AHMEDNAGAR

PRL-419. Chalcolithic Deposit; charcoal; Locus: Trench Y'4, layer 10; Depth 1-8 m. Sample no. DMD/11/1976-77.	3070±110 (1120 B.C.)
PRL-420, Chalcolithic Deposit (?); charcoal; Locus: Trench HZ64, layer 14; Depth 85 cm. Sample no. DMD/13/1976-77.	1450±140 (A.D. 540)

PRL-426. Chalcolithic Deposit; charcoal; Locus: Trench CZ61, pit 25 sealed by layer 14; depth 3-7 m. Sample no. DMD/26/1975-76/(2).	3710±150 (1760 B.C.)
PRL-428. Chalcolithic Deposit; charcoal; Locus: Trench-CZ61, pit 10 sealed by layer 11; depth 3-2 m. Sample no. DMD/28/1975-761(1).	3500±110 (1550 B.C.)
PRL-429. Chalcolithic Deposit; charcoal; Locus: Trench CZ61, layer 16; depth 3-9 m. Sample no. DMD/29/1975-76.	3490±160 (1540 B.C.)

8. SANGAMNER, DISTRICT AHMEDNAGAR

PRL-470. Upper Palaeolithic (?); fresh water shells (bivalves) from a sandy pebbly gravel, 30 cm thick, and associated with Upper Palaeolithic tools. Sample no. 1.	14840 $^{+350}_{-330}$ (12890 B.C.)
BS-78. Upper Palaeolithic (?); fresh water shells scattered on the surface of Upper Palaeolithic tools.	25390±740 (23440 B.C.)

9. NAIKUND, DISTRICT NAGPUR

BS-92. Megalithic culture; wood charcoal; Locus: Trench Cl, layer 3; depth 45 to 50 cm. Sample no. NKD/Md. 1.	2525±105 (575 B.C.)
BS-93. Megalithic culture; wood charcoal; locus: Trench C2, layer 2; depth 30 cm. Sample no. NKD-1978, Md. 1.	2565±105 (615 B.C.)

10. INAMGAON, DISTRICT PUNE

BS-103. Early Jorwe culture; wood charcoal; Locus: Trench D1-D2, Sq. E6, sealed by layer 8, House no. 70; depth 1-7 m.	3455±110 (1505 B.C.)

PUNJAB

11. SANGHOL, DISTRICT LUDHIANA

PRL-509. Bara culture; charcoal; Locus: Trench EX-1, layer 48; depth 5-4 m. Sample no. 1.	3680±160 (1730 B.C.)

PRL-510. Bara culture; charcoal; Locus: Trench FX-2, pit sealed by layer 19; depth 3.4 to 3.8 m. Sample no. 3.	3650±150 (1700 B.C.)
PRL-511. Bara culture; charcoal; Locus: Trench FX-2, layer 23; depth 3-9 to 4 cm. Sample no. 4.	3850±160 (1900 B.C.)
PRL-512. Bara culture; charcoal; Locus: Trench FX-2, layer 22; depth 3-8 to 4-1 m. Sample no. 5.	3340±110 (1490 B.C.)
PRL-513. Bara culture; charcoal; Locus: Trench EX-1, kiln sealed by layer 40; depth 7-7 m. Sample no. 6.	3640±160 (1690 B.C.)
PRL-515. Late Grey ware level; charcoal; Locus: Trench DX-1, layer 33; depth 6-2 m. Sample no. 8.	2000±100 (50 B.C.)
PRL-516. Black-slipped ware level; charcoal; Locus: Trench DX-1, layer 32; depth 7 m. Sample no. 9.	1930±100 (A.D. 20)
PRL-517. Black-slipped ware level; charcoal; Locus: Trench DX-1, layer 31; depth 6 m. Sample no. 10.	2040±140 (90 B.C.)
PRL-518. Black-slipped ware level; charcoal; Locus: Trench DX-1; layer 30; depth 5*5 m to 6 m. Sample no. 11.	2040 ±100 (90 B.C.)

UTTAR PRADESH

12. AYODHYA, DISTRICT FAIZABAD

PRL-456. Early historical level; charcoal; Locus: Trench AYD-4, pit X sealed by layer 30; depth 11-2 m. Sample no. Ch. S. no. 5.	2420 ±150 (470 B.C.)
PRL-459. Early historical level; charred rice; Locus: Trench AYD-6,B, pit sealed by layer 7; depth 4 m. Sample no. Ch. S. no. 8,	1970 ±90 (20 B.C.)

PRL-458. Early historical level; charcoal; Locus: Trench AYD-8, layer 9; depth 3-1 m. Sample no. Ch. S. no. 7.	1970±160 (20 B.C.)
BS-69. Early historical level; charcoal; Locus: Trench AYD-8, layer 9; depth 3-12 m. Sample no. Ch. S. no. 7.	2125±125 (175 B.C.)
BS-66. Early historical level; wood charcoal; Locus: Trench AYD-6B, pit sealed by layer 7; depth 4 m. Sample no. Ch. S. no. 8.	2035± 125 (85 B.C.)
BS-70; Early historical level; wood charcoal; Locus: Trench AYD-5, Sq. Bi, Qd.I, layer 12; depth 4.31 m.	2190±105 (240 B.C.)

VI. PALAEOBOTANICAL AND POLLEN ANALYTICAL INVESTIGATIONS'

SAMPLES FROM INDIA

GUJARAT

1. SURKOTADA, DISTRICT KUTGH.—A comparative study of as many as forty carbonized grains referred to as *Setaria* spp. *(S. viridis,* the green bristle grass and *S. italica,* the Italian Millet: *1974-75,* p. 78 and *1975-76,* p. 86) along with the modern ten species of the genus *Setaria* has revealed that some of the grains compare very well with those of *S. verticillata* (the Bur, Rough Bristle Grass). In spite of these morphological comparisons, the carbonized grains are much smaller in size than those of the corresponding modern species. The size of modern grains of *Setaria viridis* on carbonization in the laboratory tends to increase (Van Zeist; 1970, *Palaeo-historica,* 14, pp. 42-173) suggesting that carbonized *Setaria* grains should be bigger than the modern ones. Based on these observations the carbonized *Setaria* grains which are much smaller than those of any of the modern species possibly belonged to unknown wild species rather than to those with the seeds of which they compare both in shape and sculpturing (Vishnu-Mittre and Savithri: 1978, *The Palaeobotanist,* 25, pp. 559-64). In the context of enormous quantity of carbonized grains of several wild herbs discovered from this site, it would appear reasonable to believe that the grains of *Setaria* were also collected from wild species. If at all some of them belonged to the cultivated strains, their small size would suggest early steps towards domestication of wild *Setarias.*

By and large, the evidence of the enormous quantity of wild grains strongly suggests that a section of the Harappan population at Surkotada might have been food-gatherers. Whether they collected wild seeds for their personal use or for cage birds or for both the purposes remains to be determined.

MAHARASHTRA

2. NAIKUND, DISTRICT NAGPUR.—Ancient food grains of five species of cultivated and wild plants were recovered through Floatation Technique from the megalithic habitation site at Naikund. The period has been tentatively assigned to *circa* seventh-sixth century B.C. on the cultural grounds. The grain assemblage represents the following plants: Wheat *(Triticum* sp.); Lentil *(Lens esculenta* Moench); Common Pea *(Pisum arvense* Linn.); Black gram *(Phaseolus mungo* Roxb.); and Indian jujube *(Zizyphus* sp.).

RAJASTHAN

3. LUSKHAR, DISTRICT AJMER; LUNKARANSAR, DISTRICT BIKANER; SAMBHAR, DISTRICT JAIPUR; AND DIDWANA, DISTRICT NAGPUR.—The environmental analysis (Vishnu-Mittre and Saxena : 1978, *International Symposium on Arid Zone Research and Development,* CZRI, Jodhpur, in the press) of the Rajasthan pollen diagrams dating from 10,000 years B.P. (Singh, *et al* : 1974, *Phil. Trans. Roy. Soc.,vol.* 267, pp. 467-501), reinterpreted in the background of the desert vegetation surveyed and described (Gaussen, *et al :* 1972, Trav. Sect. Sci. Tech. Inst., Francais de Pondicherry, Hors.Ser.no. 12, pp. 1-154; and V. M. Meher-Homji and S.K. Saxena : 1977 :

Contributed by Dr Vishnu-Mittre and Shrimati Savithri Ravi of the Birbal Sahni Institute, of Palaeobo-tany, Lucknow (items: 1 and 3-6) and Shri M. D. Kajale of the Deccan College Post-graduate and Research Institute, Pune (item: 2).

Descrification and its control, ICAR Publ., pp. 160-92) reveals alterations in five desert plant communities, namely the Halophytic scrub on saline/alkaline soils, the aquatic and marsh plants, the mixed Xeromorphic thorn forest on stabilized or activized sand-dunes and on deep calcareous sands, and the Lithophytic scrub, a degraded scrub due to biotic interference. The salient features of the precise environmental analysis of Rajasthan pollen diagrams as attempted (Vishnu-Mittre : 1978, *The Palaeobotanist,* 25, pp. 549-58) are mentioned as follows. The precipitation was graded E to W in the range of 150-400 (proportionately more in winter than in summer) with dry period extending from 9-11 months, the xeromorphic index over 250 and the mean temperature of the coldest month ranged from less than 15°C to 20°C. The climate continued to be arid.

The environmental inference during each pollen zone from top to bottom is given below.—

Phase VI	1500 years B.P. to present.	Psammophytic scrub at Lunkaransar only; arid climate.

This phase started earlier and the sediments below have not yielded pollen. The sequence at Pushkar lake may be referred to here though it is undated. Thus at Pushkar the psammophytic scrub encroached upon the *Anogeissus pendula* forest which had recovered thereafter. This is the region where *Calligonum polygonoides* of the psammophytic scrub reaches the maximum limit of precipitation and distribution. The change witnessed may be due to biotic interference causing decline of *Anogeissus* forest.

Phase V	4000 to 2500 B.P. (Lithophytic scrub represented by *Capparis)*	Erosion; gravelly plains; biotic degradation of vegetation; arid climate.
Phase IV	5000-4000 B.P. (sedges, tree and shrub savannah and increase in exotic pollen)	Strong aeolian activity; reactivizing of sand-dunes; stabilized sand-dunes in the alluvial and aeolian phase (shrub coppice dunes); possibly more meander lakes formed; arid climate.
Phase III	9500-5000 B.P. (small tree, shrubby grass, *Artemisia* and chenopod savannah)	Low stablized dunes with shallow sandy cover on rocky substratum; expansion of lakes at 6000 years B.P.; arid climate.
Phase II	10,000-9500 B.P. (sedges, grass and *Artemisia)*	Meander lakes established under arid climate.
Phase I	Before 10,000 B.P.	Strong aeolian activity with the moving sands chocking the meandering rivers; arid climate.

UTTAR PRADESH

4. KOLDIHWA, DISTRICT ALLAHABAD.—TWO C-14 dates (PRL-100 : 7390±240 B.P. and PRL-101 : 6480±185 B.P.) now available for the bottom chalcolithic levels confirm that the wild and cultivated strains of rice were used at this site. This, being the world's oldest record of rice, extends the centre for domestication of rice from South-east Asia to the Gangetic plains. In course of time, rice spread from here to the west and east of north India and along the eastern Rajasthan to Maharashtra and deep into the south where it reached by about 3000 years ago.

5. MEANDER LAKE NEAR SARAI NAHAR RAI, DISTRICT PRATAPGARH.—A pollen diagram has been published (H. P. Gupta : 1978, *The Palaeobotanist,* vol. 25, Silver Jubilee Volume,

pp. 109-19) from one of the meander lakes in the saline/alkaline region drained by the Bakulahi river, about 15 km south-west of Pratapgarh and about 4 km from Sarai Nahar Rai, the famous Mesolithic site.

The soil profile is made up of about 2-5 m of lacustrine sediments (dark silty organic mud) overlying sandy sticky clay (about 60 cm) with scattered nodular *kankars.* Both the *kankary* sand and clay constitute the old alluvium. The 2-l-2"0-m depth is dated to about 4500 years B.P. (BS-2 :4348±130B.P.).

During the four local Pollen Zones, the progression of grass-chenopod-prosopis Savannah into the *Anogeissus-Tecomella-Prosopis-Mimosa* Savannah and finally the decline of trees and shrubs is believed to have been governed by the progression of climate from arid to semi-humid. The inference is not supported by a control of modern pollen spectra and by the climatic requirements of the plants identified. Further, the pollen curve of 60 or above 60 cereal pollen type commencing from about 5000 years B.C. is inferred to show the history of farming.

In the light of the known climatic requirements of the plants identified (it is hoped that the pollen identifications are unquestionable) the vegetational sequence shows the development of the Riverine Thorn Forest, as given below.—

Phase I (at the bottom of the profile): the basal *kankary* sand and stiff sticky clay is suggestive of prevalence of environment in which evaporation/precipitation ratio was much higher resulting in halophily responsible for widespread chenopods. *Prosopis* grew on higher ground with Typha along the shores of the river of its meanders.

Phase II (about 5000 B.G.) : the old alluvium, was encroached upon by a meander which was abandoned to form the lake. The immigration of *Anogeissus Salmalia, Holoptelea* and *Tecomella undulate* established tree-shrub savannah on the abandoned river banks. An environment of periodic inundation and water-logging had prevailed and the combination of the identified genera occurs within 400-950 mm precipitation; *Anogeissus* particularly on clayey or gravelly sand derived from metamorphic rocks. All these possess long tap root or root suckers to withstand arid conditions.

Phase III : *Anogeissus-Tecomelia* savannah was formed.

Phase IV : the decline of trees and shrub elements towards the top of the diagram may be ascribed to exploitation for fuel and fodder.

The commencement of pollen above 60 and its subsequent increase to over 10 per cent is more suggestive of the immigration of wild grasses, such as *Themeda* spp., *Heteropogon* and *Coix lacryma jobi,* which produce large-sized pollen. The latter is also believed to have been cultivated in north India for its grain. The cultivation of maize is out of question for it was introduced in India much later in history.

SAMPLES FROM ABROAD

PAKISTAN

6. MOHENJO-DARO AND CHANHU-DARO, DISTRICT SIND.—Morphostatistical analyses of the grains of wheat referred to *Triticum aestivum* and *T. compaction* reveal that owing to minor difference in the grains of both these species they should preferably be referred to as *T. aestivum-compactum* group rather than individual species.

VII. MUSEUMS

1. ARCHAEOLOGICAL MUSEUM, BODH GAYA.—Ten new sculptures were displayed in the museum. Further, the flooring of the galleries was relaid with polished Shahabad slabs.

2. PRINCE OF WALES MUSEUM, BOMBAY.—The Museum in collaboration with the Archaeological Survey of India, organized an exhibition : 'the Lure of Art' (pl. LIV A), a theme devoted to the display of two hundred fifty confiscated antiquities to focus public attention on mutilation and loss of culture heritage. New additions to the Sculpture Gallery include four bronzes and pottery etc., from Daimabad. Besides, two stone sculptures and one bronze buffalo from Daimabad were made available for the Indian exhibition in Paris. A multi-media presen tation, 'Indian Art through the Eyes of Coomarswamy' was presented in the Coomarswamy Hall of the museum to mark the closure of the birth centenary year of Dr A. K. Coomarswamy. An illustrated catalogue entitled *Animal in Indian Art* was also released.

3. ASUTOSH MUSEUM OF INDIAN ART, CALCUTTA.—The collection of the museum was enriched by the addition of bornze and stone sculptures, wood carvings, illustrated paper manuscripts, Pahari paintings, specimens of folk-art, an inscribed bronze image of Jaina *tirthankara* (pl. LVA), ascribable to the ninth-tenth century A.D. and a Nepalese illustrated manuscript of Devimahatmya (pl. LIV B), datable to sixteenth century A.D.

Setting up of the Gallery on the Eastern Indian sculptures is nearing completion.

4. INDIAN MUSEUM, CALCUTTA.—During the year under review the Museum acquired, through purchase, gift and field explorations: five silver coins belonging to the Mughals and East India Company; one Burmese manuscript with gold-plated lacquered leaves from Shrimati Reva Sinha; one oil and six water-coloured paintings; one bronze incense burner of Tibetan origin; six *maslandi* mats of Midnapore; and twenty Chhau masks of Purulia (pl. LIV C).

Three new galleries on South and East Asian Art in the Art Section consisting of the collections of Chinese, Japanese, Burmese, Nepalese and Tibetan Art objects (pi. LVI) were declared open to the public. The exhibits include two hundred and twenty-five antiques.

The Museum organized four temporary exhibitions: Centenary of Schools of Paintings in Calcutta; International year of Child; Recent Collections of the Museum (1973-78); Plenary session of the International Symposium on Folklore and Literary Anthropology; and Stamps on Museums in India.

5. VICTORIA MEMORIAL HALL, CALCUTTA.—One oil painting of C. Rajagopalachari and one ink-portrait of Tantiya Tope, several busts in plaster, one old printing machine (1884) and twenty-four old blocks on wood and metal were added to the collection. Moreover, on the recommendation of the Art Purchase Committee, the Museum also obtained seventy-five objects including palm-leaf paintings, silver dagger, Khurasen steel shield, coins, *pata-chitra* and paintings.

Reorientation programme of the Hall with open-air theatre and historical sculptural galleries is in progress.

6. ARCHAEOLOGICAL MUSEUM, CHANDIGARH.—The objects acquired during the year under review include stone tools, protohistoric objects, terracottas, stone sculptures, inscrip tions and coins.

7. ASSAM STATE MUSEUM, GAUHATI.—Museum is enriched by the collection of thirty-three silver coins from Sonari, District Sibsagar and two copper-plate inscriptions, one from the Officer-in-charge, Bihapuria Police station, District Lakhimpur and the other from A. K. Barua, Registering Officer, Jorhat Branch, Jorhat, all belonging to the Ahom period:

8. ARCHAEOLOGICAL MUSEUM, HALEBID.—During the year under review the Museum acquired an image of Kartikeya. Newly-built Sculpture Gallery was provided with newly designed lighting arrangements for the wooden sculptural exhibits. The interior walls of the gallery was painted suitably with matching colour.

9. ARCHAEOLOGICAL MUSEUM, HAMPI.—During the year under review three sculptures of the Vijayanagara period from the Hampi ruins were acquired and exhibited in the museum. Skylight ventilators in the Galleries 1 and 2 were fitted with ornamental grill exhibiting Vijayanagara architectural designs.

10. SALAR JUNG MUSEUM, HYDERABAD.—The Museum obtained in its collection a unique and early Sultanate jade *rehl* Quran stand, ascribable to the time of Sultan Shamsuddin Altamish on the basis of inscription on its obverse reading *Shamsuddin Altamish Padshah* and on the reverse reading *Son 607 Hijri.* It measures 15-6 cm in height and 10-0 cm width.

11. CENTRAL MUSEUM, INDORE.—Arrangements are being made to open a new gallery for sculptures collected from Hinglajgarh, District Mandasore.

12. ARCHAEOLOGICAL MUSEUM, KONARAK.—Steps were taken for spotlight arrangement to focus attention on important objects displayed in the Gallery no. 1 of the Museum.

13. STATE MUSEUM, LUCKNOW.—During the year under review the Museum is enriched by the addition of a set of nineteen terracottas and nine seals ranging in date from *circa* second century B.C. to sixth century A.D. obtained from Kausambi and Basti. The following newly-acquired antiquities deserve special mention : a plaque (size 14.5 X 8.5 cm) showing an amorous couple seated inside a pond of lily, datable to first century A.D. ; a toy-cart (size 9 X 9 cm) with carving on three sides and a pair of bulls in front, ascribable to *circa* second century A.D. ; a fragmentary panel (size 14 X 13 cm) depicting the figure of Gauri, of sixth century A.D.; a *yaksha* (size 16 X 10 cm) seated with an animal in his left and a hammer in his right hand; a plaque (size 12 X 9-5 cm) of the Sunga period and a head of Siva (size 10 X 7.5 cm) of the Kushana times, all from Kausambi. A panel (size 20 X 14-5 cm) depicting gracefully a female-bust from Basti belongs to the Gupta period.

14. DISTRICT MUSEUM, MANDLA.—The museum added in its collection a number of sculptures, treasure trove finds, fossils and inscriptions from different sites.

15. ARCHAEOLOGICAL MUSEUM, FORT ST. GEORGE, MADRAS.—The Gallery 3, displaying the postal stamps, was provided with new wall showcases replacing the old ones. An illustration showing different types of palanquins which were in vogue during the last three hundred years was exhibited in Gallery- 4.

16. GOVERNMENT MUSEUM, MADRAS.—The Museum during the year under review acquired forty-two treasure trove finds from various parts of the State including dozen bronze images, six terracottas, nine metal images (either declared unclaimed or confiscated), three stone sculptures and four miscellaneous objects. The Bronze Gallery is enriched by the addition

of six bronze images. Furthermore, three paintings were added to the National Art Gallery.

17. GOVERNMENT MUSEUM, MATHURA.—During the year under review, the Museum has acquired eighty-five objects including twelve coins, thirty-six sculptures, thirty terracottas, four pottery and bricks, one seal and two beads. Of these, the following deserve special mention : one base gold coin of Govind Chandra Deva of Gahadavala dynasty and bears legend *Lakshmi* on the obverse and *Srimad Govind Chandra on* the reverse from the Secretary, U.P. Coin Committee; a broken screen (size 73 X 39 cm) in red sandstone, belonging to the Kushana period from Govindnagar; a headless seated image of Buddha (size 62 X 63 cm) in spotted red sandstone (pl. LV B), from Shri O. P. Makhija of Triveni Engineering Works, with the legend in two lines in Brahmi characters, recording" the installation of an image of Buddha by *Kayastha Bhatti-priya,* son of *Bhattisen* and grandson of *Bhattihasti* (pl. LV C); a headless image of *tirthankara*(size 34.5 X 42 cm) in spotted red sandstone with badly-corroded legend recording the year 35, belonging to the Kushana period from the Saptarishi Mound, Mathura City; and a head of Buddha (size 16 X 19 cm) in red sandstone belonging to Kushana times from the Old Museum Building premises. The antiquities collected from Govindnagar are being exhibited in a new gallery which will shortly be thrown open to the public.

A number of programmes on art, archaeology and literature and temporary exhibitions on the method of preservation of manuscripts and old records were organized.

18. PALACE MUSEUM, MYSORE.—Forty-four sculptures, seventy-three coins and three inscriptions were added to the Museum collection.

19. CENTRAL MUSEUM, NAGPUR.—The Main Hall of the Archaeological Gallery of the Museum was reorganized into the Prehistoric and Medieval Sections. Wooden pedestals were prepared for fixing the sculptures.

20. NATIONAL MUSEUM, NEW DELHI.—During the year under review the Museum acquired five hundred and thirty-five objects of various categories, important among them being : two late medieval bronze image of Siva (pl. LVII A) and Ganesa with Sakti (pl. LVII B) from Tamil Nadu and Kerala respectively; four stone images of Visvarupa Vishnu from Shamlaji, datable to the ninth century A.D. ; Chandra in Chola style of the tenth century; Vishnu of the Pala period of the twelfth century A.D. ; and Skanda of the Vijayanagara period of sixteenth century A.D.

Seven special lectures on various aspects of art and archaeology and three special exhibitions on 'Einstein'; 'Reproduction of Murals from Ajanta and other places' and' Paintings of Thanjavur School' were organized.

21. STATE MUSEUM, NOWGAON.—Few sculptures discovered from Achal and Khajuraho were displayed in the Museum. A separate section for inscriptions was also organized.

22. SITE MUSEUM, PINJORE.—The Department of Archaeology and Museum, Government of Haryana, organized an open-air museum in the premises of the protected monument of Bhima Devi temple. Mostly comprising sculptures and architectural members of the ancient ruined temples of the times of the Gurjara Pratiharas it is only a temporary set-up.

23. DISTRICT MUSEUM, RAJGARH.—A number of sculptures belonging to the medieval Brahmanical and Jaina pantheons were added to the Museum collection.

24. ARCHAEOLOGICAL MUSEUM, SARNATH.—Gallery 4 of the Museum was reorganized and declared open to the public. Specially-designed pedestals were introduced and concealed lighting arrangements provided. Spotlight arrangements to focus attention of the visitors on important antiques were introduced in the Main Gallery of the Museum.

25. TIPU SULTAN'S MUSEUM, SRIRANGAPATNA.—During the year under review the galleries of the museum were extended from the first floor to the ground floor by opening two new sections on arms and manuscripts, and on inscriptions.

26. MUSEUM AND PICTURE GALLERY, VADODARA.—The Museum received back the follow ing antiquities from the National Museum, New Delhi: Sakta image from Dabhoi; an erotic stone panel datable to the tenth century A.D. ; a wooden portrait; and a wooden facade of an old house from Vadodara.

27. DISTRICT MUSEUM, VIDISHA.—A bust of a colossal Trimurti Sadasiva from Gyaraspur was added to the Museum collection.

28. ARCHAEOLOGICAL MUSEUM, VELHA GOA.—One Portuguese coin and an iron anchor were added to the collection of this Museum. A few cannon were displayed on pedestals of stone masonry in front of the Museum after applying preservative coating. The portrait paintings were suitably framed and exhibited in the gallery after chemical treatment. Wall showcase was designed suitably. Spotlight arrangements were appreciably improved.

ARCHITECTURAL SURVEY OF TEMPLES

NORTHERN REGION.—The Temple Survey Project, Northern Region of the Survey under R. D. Trivedi continued the survey of the temples of the Pratihara period in the Districts of Guna, Shivpuri and Tikamgarh in Madhya Pradesh. A flat-roofed clerestoreyed Siva temple at Mahua District Shivpuri, consisting of a *garbha-griha* and *mukha-mandapa,* is notable for its post-Gupta features. The temple, assignable to the seventh century, has *adhishthana* decorated with the typical square and ornate rafter terminals *(tulapitha)* on its *bhadra-kumuda* mouldings, and simple pilastered *jangha* with a shallow niche in the central parts under a *nasika-dormer* on each side. The images of Ganesa, Mahishasuramardini and Varaha are represented on the three *bhadra-niches.* Another Siva temple here has a damaged *sikhara* though its massive *amalaka* is in position. It, too, has a bold *adhishthana* characterized by twin rafter terminals, imitated in stone on the *anurathas* only. It has a plain *bhitti* set off by the bold and fully delineated *bhadra*-niche which is complete with pilasters, beam, rafter course, cornice and *udgama,* followed by pilastered entablature overlain by the *sikhara.* The *venukosa* and *anuratha* of the *sikhara* carry *amalakas* in three *bhumis.* This temple may be dated to the eighth century A.D.

The Sun temple at Umri (fig. 10) and another at Markhera (pl. LVIII A), about fifty kilometres from each other, in District Tikamgarh, represent important landmarks in the Pratihara temple-architecture of the ninth century. Both the temples are *pancharatha* in plan and consist of a *garbha-griha* (sanctum), a very narrow *antarala* (vestibule) and *mukha-mandapa,* the last-mentioned unit being rectangular in plan and formed by two front pillars and two wall pilasters of the *antarala.* In elevation both of them are characterized by simple but bold *adhisththana, jangha* with elongated *udgamas* pediments) over the niches on the *bhadra* and *karna* only, *sikhara* marked with flat *bhumi-amalakas* at the corners *{karnas)* of seven *bhumis* in the case of Umri and nine in the other and a huge *amalaka* on the top which differs in the shape from one another. In both the temples, the *lalata-bimba* above the doorway and all the *bhadra-rathikas* under *khura-chhadyas* contain the images of the Sun god on his chariot. On the *karna-koshthas,* the images of *ashta-dikpalas* are found represented. The Sun temple at Umri reveals its slightly earlier date than that at Markhera by the comparative study of details of their architectural members and art-motifs.

A Siva temple which may be later than the temple at Mahua but earlier to the Sun temple at Umri is found in front of the ancient *gadhi* in the village Terahi (pl. LVIII B), hardly two kilometres from Mahua. Though of medium size it is an ornate and fully preserved example. The three *bhadra-rathikas* (central niches) under *khura-chhadya,* which the *karna-koshtas* also possess, contain the images of Parvati, Karttikeya and Ganesa facing the north, east and south respectively. The eight *karna-niches* represent two-handed standing *ashta-dikpalas* as at Umri and Markhera. Even the *suka-nasa* is similar to that at Umri.

The Siva temple known as Gargaja at Indore, District Guna, is another notable temple surveyed during the period under review. It is unique in being circular in plan with nine *bhadras* (offsets) occupied by the pedimented niches on the *jangha.* The eleven niches on the *jangha,* including two on the rectangular *antarala* wall, have variously *ashta-dikpalas,* Ganesa, Karttikeya and Parvati. Datable to the eighth century, its *sikhara* has three *bhumis* but badly damaged.

Quite a few medieval temples have been noticed by S. N. Kesarwani, of the same office, at Paroli and Mudela, in District Morena, and Dang Birkhri and Bara, in District Bhind, all being in Madhya Pradesh. Similarly the remains of the temples of the early Kachchhapaghata times datable to the tenth-eleventh century have been found at Barhaoli, Ainti, Ardoni, Tilori and Bhainsora, all in District Morena; in all these cases a *mandapa* has been added in between the *mukha-mandapa* and *garbha-griha.*

SOUTHERN REGION.—The Temple Survey Project, Southern Region, under I. K. Sarma, assisted by K. K. Ramamurthy continued the field survey of the temples of the Western Gangas. A survey in the Districts of Bangalore and Kolar, in Karnataka, made it possible to identify edifices of this dynasty at Devanhalli and Hebbatta though they were substantially renovated during the Chola period. At Hunkonda, the image of Bhairava, seated cross-legged may be considered as a Nolamba work while an incomplete relief of Sapta-matrikas may perhaps be of the Ganga art. Further, at Sivaganga, District Bangalore, a hero-stone near the rock-cut cave known as the Honnadevi temple depicts a battle-scene in which a hero holds a double-pronged sword, a type very much recurring in the 'chamber-temples' in these areas. A war-scene with an inscription below, probably of the Ganga king Narasimha (A.D. 961-974), has already been noticed near the Kesava temple at Nerlige in District Hassan.

The ancient Kongunadu covering the Districts of Coimbatore, Dharmapuri and Salem in Tamil Nadu and Gangaperuru in District Cuddapah of Andhra Pradesh were also surveyed. An image in sandstone representing a two-handed Lakulisa in the Kudalur Mariamman temple, near Dharmapuri, is interesting. He is cross-legged, ithyphallic, seated on *kusa* grass, the right hand holding *matulunga* fruit, while the left carries a *lakuta* and may be pre-Nolamba in age. A four-faced and four-armed Brahmi found here also betrays Ganga workmanship of the eighth-ninth century A.D. These images perhaps belong to the Kongesvara temple mentioned in the Kudaluru grant of the Ganga king Madhvavarman.

Gangaperuru, in District Cuddapah, has ruined temples and inscriptions assignable to the Cholas of Renandu (eighth-ninth century A.D.) rather than the Gangas.

The sculptures from the Mallikarjuna and Kamakshiamman temples, at Dharmapuri, are unmistakably Nolamba but these include monolithic *sikhara* model, with elephant in the central *koshtha* and the pillar-types which reveal Ganga workmanship. Similar pillar-types noticed at the Somesvara temple at Adigamankottai as also another *sikhara* model, with a robust elephant, found near the very temple. The Jaina influence is clearly manifest in the area as seen from the relief-carving of a seated Jaina *tirthankara* over a granite boulder in the centre of the town (Sandaipet) and an image of Parsvanatha with an elaborate niche in front of a medieval Bhairava temple at Adigamankottai.

A cluster of six 'chamber-temples' found at Kondagapatti, near Dharmapuri, seems to recall the examples noticed earlier in Bangalore and Kolar regions. A few among them bear inscriptions in early Kannada characters assignable to the eighth-ninth century A.D.

Pundi, District North Arcot, revealed some Ganga images and lion-based pillars. Though the temple of Sri Karakanthesvara, as it stands now, is a middle Chola temple, a four-armed standing Siva with a tall *kirita-makuta* and bipartite hair falling over the ears, the *yajnopavita* extending across the right hand and the looped *kativastra* may characterize the Ganga character.

DOCUMENTATION OF TEMPLES SUBMERSIBLE UNDER SRISAILAM PROJECT.—The Temple Survey Project (Southern Region) has also undertaken the detailed documentation of major temple-complexes getting submerged under the Srisailam, Project. The earlier brick structures below the stone temple of Siddhesvarasvami at Siddeswaram shows *adhishthana* mouldings, all of moulded bricks (pl. LIX A). Its exterior had stucco-decorations in the form of *kudus, vyalas,* birds and the like. These earlier ruined shrines, of brick, appear to have been levelled up by the builders of the stone temple, raising the floor-levels and providing a drain. Inscriptions in Telugu characters date the stone temple to the tenth-eleventh century. However, in its earlier brick phase, the unit appears to have been a big complex. Several square shrines fronted by the remains of *mandapas* and porches were found. In each case, the *linga* was found fixed to a *slah-pitha* with *vari-marga* laid underground in a brick *nala* at the level of the *kumuda*-moulding. The pits and pots of red-slipped ware inside the grooves cut into the brick floor seem to relate

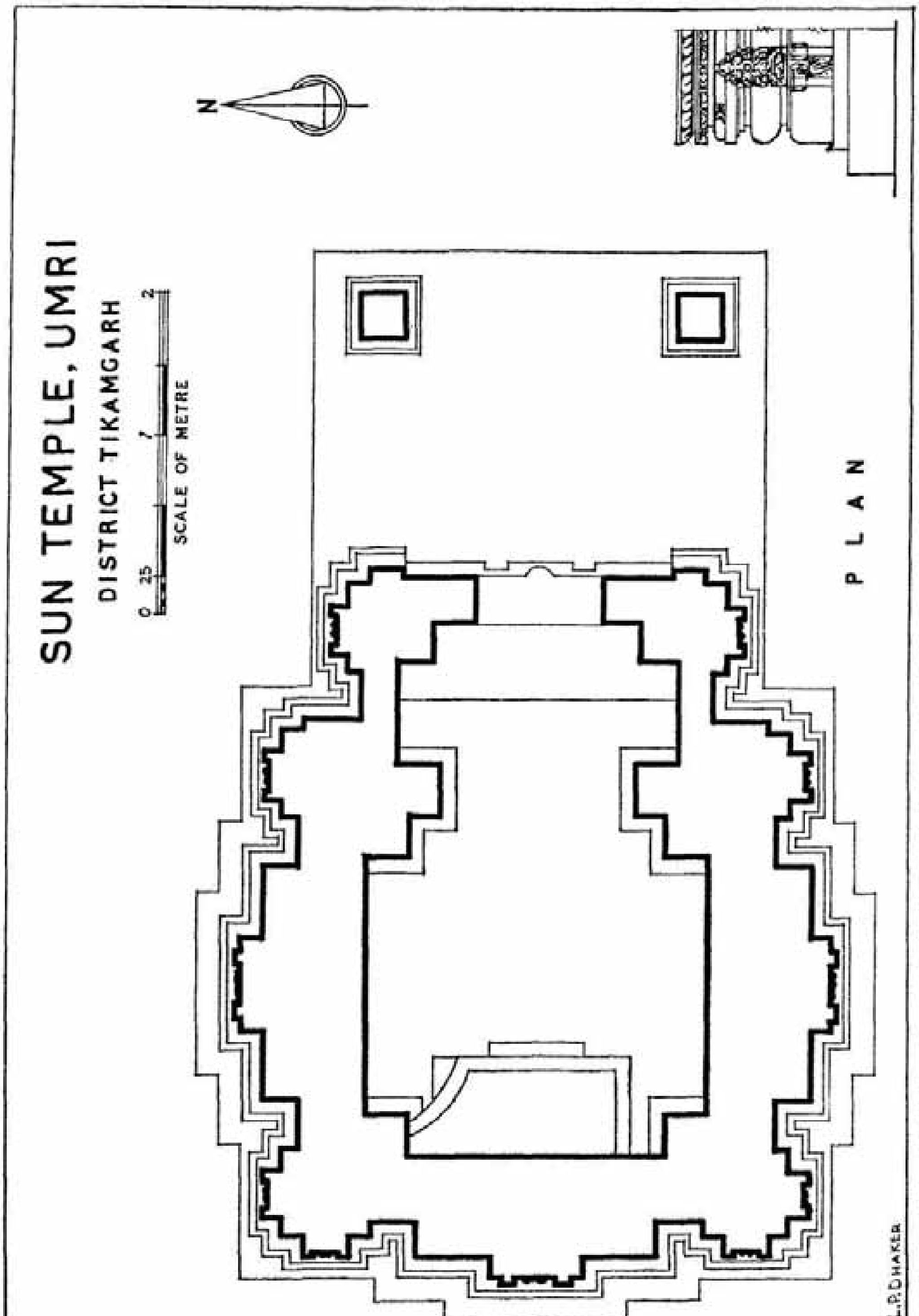

SUN TEMPLE, UMRI
DISTRICT TIKAMGARH
0 25 1 2
SCALE OF METRE
N
PLAN
L.P. DHAKER

FIG. 10.

to observance of some ceremony as per the prescriptions of the *Vastu-sastra.* The brick-size is 37 X 18 X7 cm and may indicate a date not later than the fifth century A.D.

As a result of excavations carried out at the Sangamesvara temple-site at Kudavelli by the Excavations Branch, Nagpur (above, p. 37), certain features concealed underground have now been exposed to view. The temple had an imposing *prakara* with *adhishthana* consisting of an *upana,* high *padma-jagati*—well-defined and recessed—a massive *vritta-kumuda,* the *kantha* and *prati* decorated with bold relief panels in between *nakulapada-pilasters.* These sculptured panels depict *ganas* and *mithuna-figures.* Among the fine figures are the miniature representations of Lakulisa and Bhuvaraha. A notable feature is the integration of the *matrika-subshrine* at the south-east corner of the *prakara* (pl. LIX B).

The dismantled portions (below, p. 143) of the Sangamesvara temple reveal interesting constructional patterns by the absence of bonding mortar and the use of metal ties crosswise for clamping stone blocks within; in some cases dowels and nails were driven into the grooves. Further, the tenon-mortise method was adopted for fixing the sculptures in the round and the *sikhara*-members such as *amalaka, padma-phalaka,* huge *kalasas* and *stupi.*

IX. PRESERVATION OF MONUMENTS

MONUMENTS OF NATIONAL IMPORTANCE

CENTRAL CIRCLE

Madhya Pradesh

1. KANDARIYA MAHADEVA TEMPLE, KHAJURAHO, DISTRICT CHHATARPUR.—The undulated area towards the south of the temple was levelled by chiselling off the rocks to obtain a proper level of the landscape.

2. LAKSHMANA TEMPLE, KHAJURAHO, DISTRICT ^CHHATARPUR.—In continuation of the last year's work *(1977-78,* p. 103) the dismantling of the *lakhauri* brick-work and later-period plaster from the *sikhara* of the north-western subsidiary shrine, and replacing it with cut-stone masonry with shallow fret design were completed.

Similar work was taken up on the north-eastern subsidiary shrine. The east, west and the southern faces of the *sikhara* have been completed. Restoration of the porch on the south side is in progress (pl. LX).

3. BIR SINGH PALACE, DATIA, DISTRICT DATIA.—Preliminary arrangements were made before taking up the work of providing support to the balconies and the top load. The work is in progress.

4. ROCK-CUT CAVES, BAGH, DISTRICT DHAR.—The silt accumulated in Cave nos. 4 and 6 and the fallen debris from inside the Cave nos. 4, 5 and 7 were removed. Holes were provided in the front portion of Cave nos. 4 to 7 to drain off the accumulated water from inside for which drains were also cut into the cave floor. The cracks on the facade of Cave no. 7 were grouted and pointed with toned cement-mortar. The work of de-watering the caves is in progress.

5. BHAGWANIA GATE, MANDU, DISTRICT DHAR.—The gate had developed a wide and deep crack from top to bottom on the western side to the extent that the masonry joints had almost separated and the wall had become out of plumb on this side. The mortar used in the roof had become dead allowing water to percolate inside. In fact, the monument could not be attended to earlier and no conservation works had been undertaken in view of its difficult approach. Major conservation was, therefore, initiated at this monument. An approach-path was first prepared for the transportation of materials.

To begin with, the entire western portion of the gate was dismantled from top to bottom right up to the foundation. Thereafter, the portion was rebuilt in C. R. masonry in lime cement-mortar and heavy stones were fixed with the help of clamps. The work also entailed rebuilding of portions of the arch. The entire roof of the gate was watertightened by providing a 10 era thick lime-cement concrete. The thick vegetation growth over the monument was removed (pl. LXI).

6. DAI-KI-CHOTI BAHEN KA-MAHAL, MANDU, DISTRICT DHAR.—The western wall of the ground floor and the damaged cut-stone work with motifs in relief were restored (pl. LXII).

7. DARYA KHAN'S SARAI, MANDU, DISTRICT DHAR.—In continuation of the last year's work *(1977-78,* p. 103), removal of debris and thick jungle growth from inside the cells on the eastern and southern sides was completed. It is proposed to take up similar work in the inner portion of the western side and the outer portions of the eastern, southern and western sides of the Sarai.

8. DARYA KHAN'S TOMB, MANDU, DISTRICT DHAR.—In continuation of the last year's work *(1977-78,* p. 103), the dead concrete of the roof was replaced by fresh lime concrete so as to render the top watertight.

9. DELHI GATE, MANDU, DISTRICT DHAR.—In continuation of the last year's work *(1977-78,* p. 104), the decayed concrete on the roof was replaced by fresh lime concrete, 10 cm in thickness, so as to render the top watertight.

10. HATHI POL GATE, MANDU, DISTRICT DHAR.—The deteriorated concrete on the roof of the gate was replaced by fresh lime concrete, 10 cm in thickness. The open masonry joints of the bastion were recess-pointed in lime-mortar. The work of recess-pointing of the masonry on the eastern wall of the gate is in progress. It is also proposed to repair the elephant figures flanking the gate by joining the separated portions with the help of copper clamps after removing the rusted iron clamps.

11. JAHAZ MAHAL, MANDU, DISTRICT DHAR.—Collapsed portions of the vaulted chamber on the north side of the ground floor which had created a big aperture on the roof were taken up for conservation. The arches and pillars were rebuilt in random rubble masonry with limestone facing as per the original. The roof terrace of the first floor on the north side was watertightened by fresh lime concrete after removing the decayed concrete.

12. MOSQUE NEAR TARAPUR GATE, MANDU, DISTRICT DHAR.—The mosque which has been identified by Henry Cousens *(Archaeological Survey of India, Annual Report 1912-13,* pp. 148-51) as the residence of Sir Thomas Roe during Jahangir's sojourn at Mandu, located to the west of the Tarapur gate near the tank, was found to be overgrown with thick vegetation and trees, and the flooring was completely damaged. Apart from removal of vegetation, the floor was relaid in lime-concrete. The tomb in front of the mosque, which was completely covered with vegetation and had settled into the ground, was repaired.

13. NILKANTH, MANDU, DISTRICT DHAR.—The tank on the plateau which supplied water to the cistern in the palace below through a channel was full of accumulated silt, debris and overgrowth of vegetation as a result of which the tank used to dry up completely during late winter and summer. After tracing the outline of the original tank which was found to be having on its three sides a rubble wall, the work of clearance of vegetation, silt and debris was taken up and the tank was excavated to a depth varying between 2 to 3-5 metres. Thereafter, a founda tion course in cement-concrete was laid, followed by constructing a retaining wall in coarse rubble masonry on the north, west and east sides of the tank. The work is in progress.

14. NORTH GROUP OF ROYAL PALACES, MANDU, DISTRICT DHAR.—The dead concrete over the terrace of seven rooms and the passage was replaced by a fresh layer of lime concrete to render the top watertight.

Missing portions of random rubble masonry wall were restored and underpinning was done to strengthen the overhanging portions (pl. LXIII).

15. TAVELI MAHAL, MANDU, DISTRICT DHAR.—Material was purchased for replacement of wooden railings and pillars on the first floor. The work will be taken up next year.

16. TOMB OF SHAH SHUJA, BURHANPUR, DISTRICT EAST NIMAR.—In order to check seepage of water into the foundation, the terrace over which the tomb has been built was relaid with fresh lime concrete mixed with 1/8 cement after removing the decayed concrete. Fresh stone pitching was also provided below the terrace on all the sides.

17. KATI GHATI, CHANDERI, DISTRICT GUNA.—Damaged wall has been rebuilt in C. R. masonry. Leakage of the roof has been arrested by laying a fresh layer of cement-concrete. The strengthening of the weak portions on the inner side of the arch was completed by using iron rods and general concreting in patches.

18. ROCK-CUT JAINA COLLOSI, GWALIOR, DISTRICT GWALIOR.—The fallen portions of guard-wall of the platform near the entrance were repaired and missing pathway leading to the Marimata was restored with pitched stones.

19. TELI-KA-MANDIR, GWALIOR, DISTRICT GWALIOR.—The existing C. R. masonry compound wall has been raised to check scaling by visitors.

20. TOMB OF MUHAMMAD GHAUS, GWALIOR, DISTRICT GWALIOR.—As a preliminary to the large-scale work of replacing the broken ornamental *jalis* in the verandah, new *jalis* have been prepared. The work is proposed to be taken up next year.

21. PAINTED ROCK-SHELTERS, ADAMGARH, DISTRICT HOSHANGABAD.—In continuation of the last year's work *(1977-78,* p. 104), the remaining work of barbed-wire fencing was completed.

22. CHAUSATH-YOGINI TEMPLE, BHERAGHAT, DISTRICT JABALPUR.—Pipe-railing has been provided on the outer circumambulatory passage of the temple for the safety of visitors.

23. GAURI SHANKARA TEMPLE, BHERAGHAT, DISTRICT JABALPUR.—Work was taken up at this stone temple which had been plastered all over both from inside and outside during the last few centuries and it was believed that the entire superstructure is late and only the portion of the *garbhagriha* below the niches is original. To begin with, the thick layer of lime plaster was removed systematically from the outer surface of the *sikhara* and *jangha* portions of the *garbhagriha:* After removal of lime-plaster, the original outer stone surface of the *sikhara* of the *garbhagriha* has been entirely exposed except for the brick-built *amalaka* of the later period which is yet to be removed. After removal of lime-plaster, the cracks in the stone masonry were grouted with liquid cement-mortar and the joints pointed in toned mortar. As a result of this work it is now possible to say that the *sikhara* of the *garbhagriha,* except for the *amalaka* portion, is original.

Likewise, the original lower outer wall of the *mandapa* has also been exposed after removal of the plastered portion.

The work of removal of later lime-plaster from the interior of the *garbhagriha* of the temple and replacement of the *amalaka* is proposed to be taken up.

24. TAPSI MATH, BILHARI, DISTRICT JABALPUR.—In continuation of the last year's work work *(1978-79,* p. 105), flagstone flooring and underpinning of loose masonry stones were completed. Lime concrete base was provided below the flagstone flooring.

25. VARAHA IMAGE, KARITALAI, DISTRICT JABALPUR.—The protected area around the Varaha image and the ruined temple located about a kilometre-and-a-half to the east of the village Karitalai, was enclosed with barbed-wire fencing.

26. SIVA TEMPLE, KHADDEORI, DISTRICT MANDLA.—Flagstone flooring was provided around the temple and the steps have been plastered. Barbed-wire fencing was provided around the area.

27. RANAMUKTESVARA TEMPLE, KUKARRAMATH, DISTRICT MANDLA.—The entire protected area has been provided with barbed-wire fencing.

28. ROCK-CUT CAVES, DHAMNAR, DISTRICT MANDASOR.—The pulverized roof of the caves of Surajpol and Bhimbazar area was made watertight by laying 10 cm layer of *cement-surkhi*-concrete and finished with a laver of concrete composed of cement, *surkhi* and pebbles to match with the original rock surface. The work is in progress.

29. GADHI, PARAOLI, DISTRICT MORENA.—The roof of the *dedans* has been treated with a layer of cement-concrete so as to arrest leakage of water apart from minor repairs of the gate and the temple inside.

30. BHAND DEWAL, ARANG, DISTRICT RAIPUR.—The dead concrete over the platform has been replaced by fresh concrete to make the base for flagstone flooring. Fresh pointing has been done to the walls of the sanctum after removing the decayed mortar. The work is in progress.

31. RAMACHANDRA TEMPLE, RAJIM, DISTRICT RAIPUR.—Dismantling of the deteriorated compound wall on the eastern, western and northern sides was completed and the work of reconstructing the wall is in progress.

32. LAKSHMANA TEMPLE, SIRPUR, DISTRICT RAIPUR.—The whitewashed portions inside the *garbhagriha* were cleaned in order to expose the original surface. Some patch-repairs were also undertaken. The cement-plaster on the outer surface of the *antarala,* both on the walls and the top, was removed and original surface was exposed. The *sikhara* was watertightened by filling in the joints. Barbed-wire fencing with two iron gates has been provided around the protected area.

33. BARADARI COMPLEX, FORT, RAISEN, DISTRICT RAISEN.—The bare walls of the compound have been plastered at places, deteriorated concrete of platform replaced by fresh concrete, pitched ramp was provided at the entrance to the complex and the underground water tank was watertightened.

34. PAMEYKA TEMPLE, FORT, RAISEN, DISTRICT RAISEN.—Arrangements were made to lay fresh lime-concrete in the courtyard. The work is in progress.

35. SURAI TEMPLE, FORT, RAISEN, DISTRICT RAISEN.—Disintegrated plaster on the walls was scraped off and the walls replastered and the surface pointed wherever necessary. The work is in progress.

36. PILLAR 26, SANCHI, DISTRICT RAISEN.—The pillar, which stands a little to the north of pillar 25 and east of Stupa 1 and belongs to the early Gupta period, is composed of a circular shaft with a square base. The shaft of the tapering pillar was broken into three sections and only

the basal portion was *in situ* while the other two portions were lying nearby. The pillar-capital is now on display at the Archaeological Museums, Sanchi.

The work of joining the broken pieces of the shaft of the pillar was taken up and completed. The work entailed providing stainless steel rods of 5 mm and 20 mm in diameter horizontally and vertically at five places for joining the broken portions of the shaft. Thereafter, araldite epoxy resin was used as a binding material. The surface of the joints was given a finish with a mixture of stone dust, araldite etc.

The loose stones of the masonry platform around the pillars were also consolidated in lime mortar (pl. LXIV).

37. BUDDHIST STUPAS, SONARI, DISTRICT RAISEN.—The two large *stupas,* Stupa nos. 1 and 2, which were partly collapsed due to displacement of stones and tree roots, were taken up for conservation. The work entailed eradicating of tree roots, removal of debris and resetting of the displaced masonry with the same stones to conform with the original alignment of the platform, steps and the main drum of the *stupas.* The stones were relaid as per the original construction (pl. LXV). The ancient compound wall has also been strengthened and raised wherever necessary.

It is proposed to take up conservation measures at the monastery adjoining the *stupas* next year.

38. FORT WALL, KHIMLASA, DISTRICT SAGAR.—Arrangements were made to take up restoration work of the collapsed western portions of the fort wall.

39. MAHADEVA TEMPLE, PALI, DISTRICT SAGAR.—The *sikhara* has been watertightened and missing stones of the *mandapa* restored. The loose and missing stones of the platform were set in original position and the damaged portion was restored in coarse rubble masonry.

40. BUDDHIST STUPAS AND OTHER REMAINS, PANGORARIA, DISTRICT SEHORE.—In continuation of previous year's work *(1977-78,* p. 105), the missing masonry of the *stupa* has been restored with available material.

41. BUDDHIST STUPA, GYARASPUR, DISTRICT VIDISHA.—The work of restoring the partly-collapsed casing of the *stupa* including its platform was taken up. The work is in progress.

DELHI CIRCLE

Delhi

42. ADILABAD FORT, DELHI.—Restoration of fallen and bulged out portions of the fortification at the northern and western quardrants was resumed in continuation of the earlier work (pl. LXVI).

43. ARAB-SARAI, DELHI.—The damaged and bulged wall of the inner cells was reconstructed in keeping with the original. During the operations the arches were strengthened. An ancient stepped well was partially exposed and the masonry was preserved.

44. BADLI-SARAI, DELHI.—The accretions were removed and the original structure exposed.

45. BARE KHAN'S TOMB, DELHI.—The decayed and missing veneer stones were replaced with new ones. The intrados was plastered.

46. HUMAYUN'S TOMB, DELHI.—The red sandstone screens in the tomb and terrace have been repaired.

47. JANTAR MANTAR, DELHI.—The graduation of Rama Yantra, Misra Yantra and Jai Prakash Yantra were restored as per original after strengthening the structure. The flooring of the tank around Samrat Yantra was concreted after desilting it.

48. JAMALI-KAMALI MOSQUE, DELHI.—The causeway connecting the monument with the main road was reconditioned.

49. MOHAMMADI MOSQUE, DELHI.—The damaged and bulged out compound wall in the prayer hall of the mosque was restored in consonance with the original pattern.

50. SUBJ BURZ, DELHI.—The damaged plaster of the tomb was removed, and the intact original plaster was stabilized. The cracks were stitched (pl. LXVII).

Rajasthan

51. MUDTOR-KI-DEORI AND BAGH-KI-DEORI, NEELKANTHA, DISTRICT ALWAR.—The clearance work carried out at the Mudtor-ki-Deori and Bagh-ki-Deori with a view to expose original plans of the temple has resulted in the recovery of many sculptures and structural members of the temple. The work is in progress.

52. JAWAHAR BURZ, DISTRICT BHARATPUR.—The huge brick masonry wall along the Jawahar Burz was restored and the alignment wall was reset (pl. LXVIII).

EASTERN CIRCLE

Assam

53. CHARAIDEO MAIDAM, CHARAIDEO, DISTRICT SIBSAGAR.—The growth of plants, vegetation and jungles was cleared.

54. RANGHAR PAVILION, JAYASAGAR, DISTRICT SIBSAGAR.—The work of repairing *chhajja* and fencing the protected area is in progress (pl. LXIX).

55. SIVA PEMPLE, NEGHERETING, DISTRICT SIBSAGAR.-—The work of dismantling the *mandapa* was completed and the *sikhara* was replastered.

Orissa

56. ANCIENT SITE AT HARIPURGARH, DISTRICT MAYURBHANJ.—The work of grouting and filling the cracks, widened joints, as well as pointing the cracks by cement mortar in the south and west sides of the temple along with south and west sides of the porch was done. The missing bricks of the Radhamohan temple were also renewed.

57. VAITAL DEUL BHUBANESWAR, DISTRICT PURI.-Cutting and dressing of stones for fixing them up in required places had been done.

58. BAKESVARA TEMPLE, BHUBANESWAR, DISTRICT PURI.—The work of dressing and carving stones and grouting the widened joints and cracks of the temple was done (pi. LXX).

59. ISANESVARA TEMPLE, BHUBANESWAR, DISTRICT PURL—The missing stones of the temple were replaced.

60. LINGARAJ TEMPLE, BHUBANESWAR, DISTRICT PURI.—The open joints on the north-east corner of the temple were sealed and the missing portions were renewed.

61. MANGALA TEMPLE (LINGARAJ TEMPLE-COMPLEX), BHUBANESWAR, DISTRICT PURI.—The *pidhas* of the temple were renewed and details carved.

62. MUKTESVARA TEMPLE, BHUVANESWAR, DISTRICT PURI.—The joints and cracks appearing on the temple were grouted and pointed.

63. SISIRESVARA TEMPLE, BHUBANESWAR, DISTRICT PURI.—The ornamental designs were reproduced on some portions of the repaired face.

64. SUN TEMPLE, KONARAK, DISTRICT PURI.—-The carved pieces of stone in the Sun temple compound were carried to the museum for documentation. Construction of a pathway around the temple was also done. In the *natamandapa,* the joints and voids were grouted and the ornamental designs were reproduced.

65. JAGANNATH TEMPLE, PURI, DISTRICT PURI.—In continuation of the previous year's work *(1977-78,* pp. 108-109), the work of pointing the cracks and widened joints, resetting and refixing stones in the missing and damaged portion was undertaken (pls. LXXI and LXXII).

66. LAKSHMI TEMPLE (JAGANNATH TEMPLE-COMPLEX), PURI, DISTRICT PURI.—In continuation of the previous year's work *(1977-78,* pp. 108-109) the joints and cracks of the temple were pointed and the missing stones replaced.

Tripura

67. ROCK-CUT SCULPTURE AT UNAKOTI, DISTRICT NORTH TRIPURA.—The vegetation and jungle on both sides on the slope of the hill was cut and cleared for mending the widened joints and cracks in cement mortar.

68. BHUBANESWARI TEMPLE, RAJNAGAR, DISTRICT UDAYPUR.—The trees appearing on the temple were uprootted, and mending of the damaged area was also done (pl. LXIII).

West Bengal

69. SIDDHESVARA TEMPLE, BAHULARA, DISTRICT BANKURA.—The missing and damaged brickwork was restored and the wall of *natamandir* was reset.

70. JOR BANGLA TEMPLE, BISHNUPUR, DISTRICT BANKURA.—The work of dressing the compound was done.

71. RASHMANCHA, BISHNUPUR, DISTRICT BANKURA.—The ornamental works of the Rashmancha were reproduced.

72. GUMTI GATEWAY, GAUR, DISTRICT MALDA.—The ornamental brick work of the gate was reproduced at places in keeping with the original design (pl. LXXIV).

73. EKLAKHI MAUSOLEUM, PANDUA, DISTRICT MALDA.—The decayed lime floor was dismantled, the foundation underpinned and the ornamental works in bricks in the missing portions were reproduced.

74. HAZARDUARI PALACE, DISTRICT MURSHIDABAD.—The decayed *bargahs* and broken tiles were changed for concrete terracing.

MID-EASTERN CIRCLE

Bihar

75. VIKRAMASILA MAHAVIHARA, ANTICHAK, DISTRICT BHAGALPUR.—The dislodged brick masonry and stone slabs of the southern flight of steps and landing were reset and finished with recessed pointing. Conserving the robbed brick masonry in front of the west chapel of the main shrine and fencing the area are also in progress.

76. ROCK-CUT TEMPLE, COLGONG, DISTRICT BHAGALPUR.—Scientific excavation was carried out revealing the remains of a brick temple of Gupta period and loose carved architectural members.

77. ROCK-CUT CAVES AND SCULPTURES, PATHARGHATTA, DISTRICT BHAGALPUR.—During the course of cleaning, some new rock-cut features were exposed.

78. A SMALL SHRINE NORTH OF TEMPLE NO. 12, NALANDA, DISTRICT NALANDA.------The brick masonry was reset in lime mortar. Fresh lime concrete floor was laid.

79. MONASTERY IA AND IB AT NALANDA, DISTRICT NALANDA.—The dilapidated and undulating courtyards were paved with special size bricks, and the existing walls were reset and watertightened.

80. SARAI MOUND SHRINE, NALANDA, DISTRICT NALANDA.—The bulged wall near the entrance of the shrine was reconstructed in keeping with original. Lime concrete floor was relaid in the foreground.

81. BIMBSAR PATH, RAJGIR, DISTRICT NALANDA.—A part of the path, washed out by a nullah was repaired by resetting the stone boulders in cement mortar.

82. GRIDHKUTA, RAJGIR, DISTRICT NALANDA.—The dislodged brick masonry was reset in lime mortar and finished with recessed pointing.

83. JIVAKAMRAVANA, RAJGIR, DISTRICT NALANDA.—Stone masonry on the southern part was reset in lime mortar. Vegetation was cleared from the monument.

84. MANIYAR MATH, RAJGIR, DISTRICT NALANDA.—Brick masonry was reset in lime mortar and the joints were rendered watertight. The repair of the compound wall was completed and removal of grass and vegetation from all over the monument was attended to.

85. SON BHANDAR, RAJGIR, DISTRICT NALANDA.—Fresh lime concrete was laid on the top terrace above the western cave. The cut water drain on the upper side of the slope was plastered.

86. TOMB OF SHAH MAKHDUM DAULAT MANERI, MANER, DISTRICT PATNA.—Fresh lime concrete floor was laid in the tomb.

87. TOMB OF SHER SHAH SURI, SASARAM, DISTRICT ROHTAS.—A stone paved apron all round the monument was provided.

Uttar Pradesh

88. ASOKAN PILLAR, KAUSAMBI, DISTRICT ALLAHABAD.—Flooring was provided around the pillar with adequate slope to drain off rain water.

89. RAJA MANSINGH PALACE, KALINJAR, DISTRICT BANDA.—Structural repairs to the palace were carried to safeguard the loose sculptures.

90. EASTERN MONASTERY NO. 2, GANWARIA, DISTRICT BASTI.—The dislodged portions of the monastic remains and top brick courses were reset in lime mortar and the joints recess-pointed.

91. MONASTERY A, KUSHINAGAR, DISTRICT DEORIA.—A brick-paved apron was provided on two sides to prevent scouring action due to water logging.

92. NIRVANA TEMPLE, KUSHINAGAR, DISTRICT DEORIA.—Brick masonry work in the plinth was completed. The work on the superstructure, however, is in progress.

93. TEMPLE NO. 1 AND MONASTERY NOS. F AND G, SAHET, DISTRICT GONDA.—Three upper courses of the monastic remains were reset in lime mortar, and masonary joints were pointed.

94. CHAR UNGLI MASJID, JAUNPUR, DISTRICT JAUNPUR.—The joints of the *lakhauri* brick masonry were watertightened by recess pointing. The ceiling of the main dome was plastered. The compound wall was provided with a turn-style gate.

MID-SOUTHERN CIRCLE

Karnataka

95. OLD DUNGEON FORT AND GATES, BANGALORE, DISTRICT BANGALORE.—The floor of the main entrance gate was paved with granite stone slabs, and recess pointing was done to the ramp. After barricading the area from the Victoria Hospital side, the area has been levelled for landscaping.

96. TIPU SULTAN'S PALACE, BANGALORE, DISTRICT BANGALORE.—Another gate was provided. Floodlighting of the garden and monument is still in progress.

97. CHANDRASEKHARA TEMPLE, KAMALAPURAM, DISTRICT BELLARY.—The bulged portions of *prastara* along with the supporting buttress wall was dismantled. The bulged portion was rebuilt. The temple has been watertightened. Missing stones and *chhajjas* were replaced.

98. GANIGITTE JAINA TEMPLE, KAMALAPURAM, DISTRICT BELLARY.—Missing stones of the flooring of the main temple were replaced. The roof was watertightened.

99. HAZARA RAMACHANDRA TEMPLE, KAMALAPURAM, DISTRICT BELLARY.—The northern side was fenced and the site was levelled.

100. PUBLIC BATH, KAMALAPURAM, DISTRICT BELLARY.—The missing stones of flight of steps were partially replaced.

101. PATTABHIRAMA TEMPLE, KAMALAPURAM, DISTRICT BELLARY.—The missing stone beams and broken roof slabs were replaced with new ones.

102. QUEEN'S BATH, KAMALAPURAM, DISTRICT BELLARY.—The fixing of barbed wire fencing, taken up during 1977-78, was completed.

103. VISHNU TEMPLE NO. 1, KAMALAPURAM, DISTRICT BELLARY'.—Missing stone *chhajjas* were replaced with new ones fashioned as per the original design.

104. VITTHALA TEMPLE, KAMALAPURAM, DISTRICT BELLARY.—Heavy stone beams and slabs for the pillars of the open *mandapa* were dressed, matching with the old design and pattern, and made ready for replacement at spots where these are missing. Work is in progress. Preparation of sub-grade for the new approach road from Talaraghatta to Vitthala temple is in progress.

105. AMBIGERGUDI, AIHOLE, DISTRICT BIJAPUR.—Missing roof slabs were restored.

106. GOUDERGUDI I, AIHOLE, DISTRICT BIJAPUR.—Missing courses of the plinth were restored with new stones along with flagstones matching the original.

107. GOUDERGUDI II, AIHOLE, DISTRICT BIJAPUR.—Missing courses of the plinth were restored with new stones along with flag stones matching the original.

108. HUCHCHAPPAYYA MATH, AIHOLE, DISTRICT BIJAPUR.—The out-of-plumb wall in the rear was dismantled and rebuilt in old style. The displaced capitals and lintels were set in position. Flagstone flooring was laid around the temple.

109. JAINA TEMPLE OF MEGUTI, AIHOLE, DISTRICT BIJAPUR.—The missing pillars and capitals along with plain and simple designs were restored.

110. KAREGUDI AND BILIGUDI, AIHOLE, DISTRICT BIJAPUR.—The retaining wall and the foundation of the temple were repaired.

111. VIRUPAKAHA TEMPLE, AIHOLE, DISTRICT BIJAPUR.—The missing portion of the star-shaped ceiling was restored by strengthening the broken slabs and replacing the missing ones.

112. GATES AND WALLS OF CITY AND CITADEL, BIJAPUR, DISTRICT BIJAPUR.—Damaged lintel of the Shahapur gate was restored and strengthened by inserting iron girders and finishing the surface, matching with the adjacent surface. The roof of the gate has also been watertightened.

113. GOL GUMBAZ, BIJAPUR, DISTRIGT BIJAPUR.—Flooring of the underground vaults was repaired by laying cement concrete bed.

114. IBRAHIM-I-JAMI MASJID, BIJAPUR, DISTRICT BIJAPUR.—Reconstruction of the fallen portion of the *dalans* is in progress.

115. IBRAHIM ROUZA, BIJAPUR, DISTRICT BIJAPUR.—Dislodged ceiling slabs of the roof vault were removed and reset in original position on an experimental basis. The roof was watertightened. The work is in progress.

116. TWO DIFFERENT MOATS OF CITADEL, BIJAPUR, DISTRICT BIJAPUR.—The damaged and bulged portion of the walls of the ditch were repaired.

117. YUSUF'S OLD JAMI MASJID, BIJAPUR, DISTRICT BIJAPUR.—Erection of barbed wire fencing to demarcate the protected area is in progress.

118. BHUTHANATHA GROUP OF TEMPLES, BADAMI, DISTRICT BIJAPUR.—The old flooring of the temple was taken out, given a proper sand cushion and relaid.

119. JAMBULINGA TEMPLE, PATTADAKAL, DISTRICT BIJAPUR.—The work of restoring the missing slabs of the roof has been completed. A damaged perforated ventilator was restored with a new one matching the original.

120. KADSIDDESWARA TEMPLE, PATTADAKAL, DISTRICT BIJAPUR.—Missing ceiling-slabs were replaced.

121. SANGAMESVARA TEMPLE, PATTADAKAL, DISTRICT BIJAPUR.—Missing flagstones were replaced.

122. VIRUPAKSHA TEMPLE, PATTADAKAL, DISTRICT BIJAPUR.—The broken capital of the pillar of the *sabhamandapa* was strengthened by inserting iron girder and finishing the surface to match with the adjoining surface.

123. GALGESWARA TEMPLE, GALAGANATH, DISTRICT DHARWAR.—Missing flagstones were replaced with new stone slabs.

124. JAINA TEMPLE, LAKKUNDI, DISTRICT DHARWAR.—Reconstruction of the retaining wall on the southern and western side is still in progress. The missing pavement in front of the temple was restored.

125. CHANDRAMAULESWARA TEMPLE, DISTRICT DHARWAR.—The debris on the roof has been removed. The roof is being watertightened by laying cement concrete.

126. ISVARA TEMPLE, ARSIKERA, DISTRICT HASSAN.—The fallen portion of the walls of Prabhudeva shrine was restored with matching stones.

127. CHENNAKESAVA TEMPLE AND INSCRIPTIONS, BELUR, DISTRICT HASSAN.—Damaged stones of the exterior of the temple were strengthened and the worn-out pieces were replaced with new stones matching the adjoining surface. Few damaged stucco figures of the main

entrance *gopuram* were also strengthened. The top surface of the roof of Rama and Vahana *mandapas* have been replastered after removing the old decayed one.

128. LAKSHMIDEVI TEMPLE, DODDAGADDAVALLI, DISTRICT HASSAN.—The roof was rendered watertight.

129. BHUCHESVARA TEMPLE, KORAMANGALA, DISTRICT HASSAN.—The leaky roof of Bhuchesvara temple was watertightened. The damaged floor of the shrine was levelled by filling wherever found necessary.

130. KEDARESVARA TEMPLE, HALEBID, DISTRICT HASSAN.—The ancient enclosure wall is being strengthened by removing damaged and dislodged stones and keeping it in its position including underpinning the foundation.

131. PARSVANATHA BASTI, HALEBID, DISTRICT HASSAN.—The broken and damaged stone beams were strengthened by inserting iron girders and finishing the surface mathcing with the adjoining surface in the *navaranga* portion.

132. CHENNAKESAVA TEMPLE, MOSALE, DISTRICT HASSAN.—The roof of Chennakesava temple was watertightened and the broken slabs of the ceiling were removed and replaced by new ones. In continuation of the last year's work, the bulged portion was removed and reset in level with original wall. The *vimanas* were watertightened by grouting with cement mortar and the joints of the slabs were also filled with.

133. AKKANA BASTI, SRAVANABELAGOLA, DISTRICT HASSAN.—The sunken and damaged flooring around the Basti was levelled. The roof of the *navaranga* and *vimana* were watertighened by grouting (pl. LXXV).

134. CHANDRAGUPTA BASTI, SRAVANABELAGOLA DISTRICT HASSAN.—The accretionary wall on the rear was removed. The carved stones and other members lying here and there were collected. The leaky stone *mandapa* was watertightened. Patch plastering of the wall was attended to. The bulged portion of the *vimana* was taken out and rest in position as per original design.

135. GOMATESVARA, SRAVANABELAGOLA, DISTRICT HASSAN.—The flooring slabs of the *dalans* were taken out and reset. The parapet wall and niches in the front side were conditioned. The damaged stucco figures were also attended to.

136. RAMALINGESVARA TEMPLE, AVANI, DISTRICT KOLAR.—The missing pavement of the open courtyard is restored with new stone slabs and the whole area is levelled and dressed up.

137. SOMESVARA TEMPLE, KOLAR, DISTRICT KOLAR.—The missing flagstones were restored with new slabs.

138. BHOGESVARA TEMPLE, NANDI, DISTRICT KOLAR.—Flooring of the Srirangatirtha corridor was attended to by restoring the missing pavements with new stone slabs. The work of watertightening the roof of this portion is in progress.

139. LAKSHMI NARASIMHA TEMPLE, MAREHALLI, DISTRICT MANDYA.—The out-of-plumb walls of the *mukhamandapa* were dismantled and re-erected including replacing of corbels. A wooden door was provided to the temple.

140. NARAYANASWAMY TEMPLE, MELKOTE, DISTRICT MANDYA.—The stucco figures all around the temple are being repaired by grouting, plastering, filleting, etc. The figures were freed from rank growth of lichen and moss. The work is in progress.

141. GUMBAZ, SRIRANGAPATNA, DISTRICT MANDYA.—The Khan Khanas have been watertightened by laying two courses of flat tiles. The work is in progress. Besides, the domes of Gumbaz have been colour-washed and the missing finials have been replaced.

142. NAMBI NARAYANA TEMPLE, TONNUR, DISTRICT MANDYA.—The breaches of the *prakara* wall were reconstructed. The dislodged pillars of the *yajnasala* was set in position after relieving heavy stone beams and placing them afterwards. The broken lintels and corbels of the *yajnasala* were replaced with new ones. Missing stone pavement was provided at the sides of *mukhamandapa.* All the leaking roofs were watertightened. The damaged *vimana* of Ammana shrine was strengthened by grouting, etc. The broken beams of the *bhojasala mandapa* were replaced.

143. SIDLU MALLIKARAJUNA TEMPLE, BETTADAPURA, DISTRICT MYSORE.—The roof of the temple was waterightened.

144. SRIVIJAYANARAYANA TEMPLE, GUNDLUPET, DISTRICT MYSORE.—The terrace of the *mukhamandapa* was waterightened.

145. ARAKESWARA TEMPLE, HALE ALUR, DISTRICT MYSORE.—The leaky terraced roof was watertightened. Several life-size loose sculptures were collected.

146. RAMESVARA TEMPLE, KELADI, DISTRICT SHIMOGA.—The leaking roof was watertightened.

147. JAINA STATUE OF GOMATESWARA, KARKALA, DISTRICT SOUTH KANARA.—The rock-cut approach steps were repaired and improved.

148. MANGALADEVI TEMPLE, MANGALORE, DISTRICT SOUTH KANARA.—The damaged tile roof of the temple was repaired.

NORTHERN CIRCLE

Uttar Pradesh

149. FORT, AGRA, DISTRICT AGRA.—The main arched entrance in the south-western wall, the ceiling, the *jhalar* and the *gardna* on the west and north walls of the southern room of the Sheesh Mahal were restored. The richly-carved relief and incised stucco work were reproduced, in keeping with the original design. The work is in progress.

The missing inlaid marble piece from the pillar of the octagonal tower of the Musanman Burz was replaced after cutting the pillar portion into a neat patch and inserting the *bidie* to match with the original.

The Persian inscription inlaid in black marble along the frieze of the outer porch of the Diwan-i-Khas was taken out and reset at its original place after replacing the missing letters.

The missing inlay bars of black marble over the plinth and under the arches and the curved yellow bars of *janamaz* (musalla) of the eastern row in the prayer hall of the Moti Masjid were replaced with new ones.

The *lakhauri* brick work on the *boali* in the Akbari Mahal was reconditioned by underpinning and pointing. The decayed and weathered pillars supporting the stone lintels were made good. The flight of steps leading to the water in red sandstone were cleared of debris, underpinned with *lakhauri* brick work and pointed.

The ancient features of the building, known as Birbal's house, were brought to light after dismantling the modern accretion. The dislodged *chhajja* stones were reset after replacing the broken and missing ones with new ones.

150. JAMI MASJID, AGRA, DISTRICT AGRA.—The decayed and missing red sandstone *chhajja* with brackets, faranda, (vertical slab) etc., north of the courtyard had been replaced by new stones. The missing inlay bars of white marble were replaced with new ones from the *mauja patta* of the northern dome including its extrados after carefully resetting old inlay bars in the alignment. The exfoliated portion of the red sandstone was cut into neat patch to a depth of 7*5 to 15 cm and new stone *bidies* were provided at places.

151. TAJ MAHAL, AGRA, DISTRICT AGRA.—The worn-out marble stones of north-west upper arch and the walls of the cenotoph were removed and reset with new ones.

The decayed and missing *gola* stones on the outer facade of eastern side of the enclosure wall were replaced with new ones.

The decayed lime plaster from walls and ceilings of the underground cells towards the river side was redone.

152. MONUMENTS, FATEHPUR SIKRI, DISTRICT AGRA.—Missing inlay bars in Tansen-ki-baradari were fixed on the red sandstone.

The overhanging slabs of the facade of the Buland Darwaza were taken out and re-set with new ones.

The cavities in the intrados and extrados of the dome of the Baha-du-Din's tomb were filled up and made watertight. Broken *chhajja* stones were replaced with new ones. The damaged floor was relaid.

The fallen boundary wall of the Faizi's house was restored.

The fallen boundary wall, broken *chhajja,* farenda, plinth and *dasa* stones of the *Chhatri* outside Naubat Khana were replaced with new ones.

The structures exposed in the excavation were watertightened by laying two courses of random rubble stone masonry.

Red sandstone screen was completely provided from Jodha Bai palace to Pigeon house as per the original design.

Ribs to fix lintels and beams, missing pillar brackets, *dasa, chhajja* and lintels of the Treasury were provided.

The collapsed portion of city wall near Chor Khirki was restored.

153. RAUZA DIWANJI BEGUM, TAJ GANJ, AGRA, DISTRICT AGRA.—The broken pillars of the octagonal mausoleum were underpinned with *lakhauri* bricks and the plinth restored.

154. TEMPLES OF KHAKRA MATH IN THE MIDDLE OF MADANSAGAR, MAHORA, DISTRICT HAMIRPUR.—The temple and *mandapa* roofs were watertightened.

155. MEMORIAL CEMETERY (SOUTH OF FORT ON PHUTA DARWAZA), JHANSI, DISTRICT JHANSI.—The masonry enclosure wall towards north, east and west was underpinned. The missing steps of the main cemetery were made good with finely-dressed and simple moulded flagstones.

156. RAJA GANGADHARA RAO-KI-CHHATRI, JHANSI, DISTRICT JHANSI.—The masonry enclosure wall was provided with stone coping and the rear area of *chhatri* was fenced. The damaged plaster showing floral motifs was reproduced in the gate and compound wall.

157. RANI LAKSHMI BAI PALACE, JHANSI, DISTRICT JHANSI.—Plinth, moulded and richly carved plaster on the walls was restored as per the original design. The leakage in the roof was stopped by laying a fresh layer of concrete.

158. BELMORI TEMPLE, CHANDPUR, DISTRICT LALITPUR.—The temple was dismantled very carefully and rebuilt similar to the original after providing a strong base of masonry in cement mortar and replacing the missing stones. The walls were watertightened. The plinth around the temple was strengthened and the flooring was restored. A retaining wall was constructed along the turret for the protection of the temple against flood.

159. VARAHA TEMPLE, CHANDPUR, DISTRICT LALITPUR.—The original plinth of Varaha temple, lying buried, was exposed to view by removing the debris. The loose stones of the plinth and the structure, lying scattered at the site, were reset in their original places.

160. VISHNU AND LAKSHMI-NARAYANA SHRINES, CHANDPUR, DISTRICT LALITPUR.—The original plinth of the shrines was exposed and underpinned wherever necessary with the available stones.

NORTH-WESTERN CIRCLE

Haryana

161. FIROZ SHAH'S MOSQUE AND PALACE, HISSAR, DISTRICT HISSAR.—The dead lime concrete of the flooring of the prayer hall of the mosque was removed and fresh lime concrete laid. The fallen pillars of the basement cell of the mosque were restored, using original bricks collected from the debris in lime mortar. Besides, the fallen and out-of-plumb portions of the enclosure wall were restored with *lakhauri* brick-work in lime mortar and the joints of the brick work were recess pointed. A portion of the leaking roof of the palace was watertightened by laying cement lime concrete after removing the dead lime concrete. Fallen patches of brick work of the outer walls of the palace were also restored in conformity with the original brick work.

162. GUJRI-MAHAL, HISSAR, DISTRICT HISSAR.—Fresh lime-concrete was laid on the terrace of the lower *baradari* of the Mahal after removing the loose earth to check the seepage of water into the basement-cells.

163. GATEWAY OF MUGHAL SARAI, GHARAUNDA, DISTRICT KARNAL.—The impressive gate-houses of the Gharaunda Sarai were repaired. The fallen country brick work of the walls and arches were restored. The dead lime plaster was removed and fresh lime *surkhi* plaster applied. Brick flooring was also repaired in conformity with the original flooring.

164. CHURCH TOWER, KARNAL, DISTRICT KARNAL.—The decayed wooden rafters and planks of one of the roofs of the multi-storeyed tower were replaced.

165. KOS-MINAR, KARNAL, DISTRICT KARNAL.—One of the Kos-minars on G. T. Road at Karnal was, for the first time, taken up for repairs. The fallen patches of the country brick

work were restored and the surface of the *minar* was partly plastered and partly recess pointed with lime *surkhi* mortar matching with the original construction of the *minar.* The plinth of the Kos-minar was also repaired.

166. LODHI'S GRAVE, PANIPAT, DISTRICT KARNAL.—The grave was provided with plinth of country brick work, and lime concrete laid on the platform in order to complete the platform which has fallen out.

167. SALAR GATE, PANIPAT, DISTRICT KARNAL.—Dead lime concrete of the roof of the gate was removed and fresh cement lime concrete laid. The roof has been watertightened.

168. IBRAHIM KHAN'S TOMB, NARNAUL, DISTRICT MAHNDERGARH.—The dislodged stones of the *chhatris* on the four corners of the tomb were reset and joints of the stones were filled with lime *surkhi* mortar mixed with colouring pigment matching with the colour of the stone. The surface of the *chhatris* was watertightened. The forecourt of the tomb was provided with the flooring of stone slabs after removing the earth and damaged stone slabs.

169. JAL-MAHAL, NARNAUL, DISTRICT MAHINDERGARH.—Repairs were carried out to the dilapidated projected terrace around the Jal-Mahal. The missing slate stone brackets and parapet walls were provided on the three sides of the Jal-Mahal in conformity with the original constructions. The surface of the parapet walls has been pointed with lime *surkhi* concrete mortar. The side walls of the long causeway in between the gate house and Jal-Mahal were also repaired. The entire surface of the walls has been recess-pointed with lime *surkhi* concreted mortar in conformity with the original work. The roofs of the verandah on either side of the gate house were watertightened by laying fresh lime concrete after removing the dead concrete. The platform at the front of the gate house has also been provided with lime concrete flooring.

170. SHAH QULI KHAN'S TOMB, NARNAUL, DISTRICT MAHINDERGARH.—The accumulated debris around the plinth of the tomb was removed and arches with moulded plaster work on the plinth walls of the octagonal platform were exposed. A lime concrete pathway has been provided around the plinth of the tomb in order to check the seepage of water into the founda tion of the structure.

Himachal Pradesh

171. CHAMUNDA DEVI TEMPLE, CHAMBA, DISTRICT CHAMBA.—-The front terrace of the temple was provided with stone flooring with proper slope for drainage of water. The restoration of the fallen retaining wall with dry stone work is in progress.

172. SIVA TEMPLE, BAIJNATH, DISTRICT KANGRA.—-The water tank at the temple has been cleaned after removing the silt and vegetation growth. The dislodged stones of the steps of the tank have been reset in cement lime mortar. The protected area of the temple has been provided with M.S. grill railing and boundary wall to check encroachments and ingress of cattle. The area is being landscaped.

173. FORT, KANGRA, DISTRICT KANGRA.—The out-of-plumb and fallen portion of the fortification-wall on the middle terrace has been completed and a part of the flooring of the cells provided with chisel-dressed stone slabs in cement lime mortar in conformity with the original work.

174. BISHESHWAR TEMPLE, BIJAPURA, DISTRIGT KULU.—-An enclosure wall of coursed rubble stone masonry and a steel gate has been provided all around the temple to check encroachments and ingress of catte.

175. GAURISHANKER TEMPLE, DESSAL, DISTRICT KULU.—A retaining wall of coursed rubble stone masonry has been provided on the rear side of the temple to check the erosion of soil from hill slope.

176. HIDAMBA DEVI TEMPLE, MANALI, DISTRICT KULU.—The dislodged and out-of-plumb wall of the platform of the temple has been dismantled and the wall reconstructed with coursed rubble stone work.

177. GAURISVARA TEMPLE, NAGAR, DISTRICT KULU.—A new stone flooring with cement concrete base has been provided around the temple after demolishing the old damaged one.

178. BUDDHIST MONASTERIES, TABO, DISTRICT LAHUL AND SPITI.—Special repairs to Buddhist monasteries at Tabo were carried out in continuation of the previous year's work, {*1977-78,* p. 121). Repairs to the following *Gumphas* were undertaken during the year under review, (i) Sherlong Gumpha; (ii) Kilkhang Gumpha; (iii) Chamolong Gumpha; (iv) Dumlang Gumpha; and (v) Chambachibbo Gumpha.

Old swollen mud plaster of the external walls of the *gumphas* was removed and surface replastered with mud mixed with *bhusa* and cowdung in two or three coats. The cracked walls were opened and stitched with mud bricks in conformity with the original construction. Leaking roofs were dismantled and relaid after changing the old decayed wooden beams and rafters without disturbing the painted wooden planks of the ceiling. The roofs were watertightened by providing alkathene sheets and spraying three coats of asphalt mixed with hot kerosine oil. The roofs have been finished by laying three compact layers of earth and plastering the surface with mud as per the original surface.

179. BARSELA MONUMENT, MANDI, DISTRICT MANDI.—The enclosure wall of the Barsela monument has been repaired. The interior and exterior surfaces of the wall had been pointed in cement lime mortar and the top of the wall provided with the coping on lime cement plaster. A steel wicket gate has also been provided. Besides, the inscribed memorial stone slabs have been fixed in proper vertical position with concrete base.

180. TRILOKINATH TEMPLE, MANDI, DISTRICT MANDI.—Rank vegetation growth was removed from the *sikhara* of the temple and the cracks and rootlets were filled with liquid lime cement mortar. The dislodged blocks were dismantled and reset in cement mortar matching with the tone of the masonry.

Jammu and Kashmir

181. ANCIENT SIVA CAVE-TEMPLE, BAMZUVA, DISTRICT ANANTNAG.—The debris and modern dry stone work at the entrance of the temple were removed and a retaining wall pro vided for the convenience of the visitors.

182. ANCIENT TEMPLE, KAKAPORE, DISTRICT ANANTNAG.—The part of old weathered and disintegrated flooring around the main shrine of the temple has been demolished and flooring relaid with stone slabs in conformity with the original work.

183. RUDRESHVARA TEMPLE, LODU, DISTRICT ANANTNAG.—The missing stone flooring of the circular sanctum of the temple was restored with fine dressed stone slabs in cement lime mortar. Missing stones of the cornice at the top of the wall of the temple have also been restored by new ones in conformity with the original.

184. MUGHAL BUILDING (AROUND THE VERINAG SPRING), VERINAG, DISTRICT ANANTNAG.—The damaged stone flooring of the passage, on one side of the water channel leading to the spring, has been demolished and flooring with new chisel dressed stone slabs has been laid matching with the original flooring.

185. SIVA TEMPLE, FATEHGARH, BARAMULLA, DISTRICT BARAMULLA.—Accumulated debris around the sanctum of the temple has been removed to a width of 5 m and the buried superstructure of the temple exposed to a height of 3 m. The heavy stone blocks of sculptural and architectural panels of the temple, discovered from the excavations, have been properly arranged around the temple. Besides, the protected area of the temple has been fenced with barbed wire and a steel gate provided.

186. BUDDHIST MONASTERIES, ALCHI, DISTRICT LEH.—Special repairs were undertaken to Nampar Namzad La-Khang, Soma Sumastic Jam-Yang La-Khang, and Lotsva La-Khang and cracked portion of the outer walls of these *gumphas* were stitched with mud bricks in mud mortar as per original. The damaged old mud plaster was removed and surface replastered in mud mortar mixed with earth and *bhusa* in two or three coats as per the original plaster. Loose and dislodged rubble stone work of the plinth of the *gumphas* was properly reconstructed. The fallen buttresses in front of the *gumphas* were restored. The leaking roofs of the *gumphas* were watertightened by laying alkathene sheets and earth. Damaged floors of the *gumphas* were repaired with mud concrete in conformity with the original construction. The accumulated debris around the *gumphas* was removed. The work is in progress (pl. LXXVI).

187. BUDDHIST MONASTERIES, HEMIS, DISTRICT LEH.—The dislodged and out-of-plumb northern rubble stone wall of the Bep-Khang was dismantled and reconstructed with cement mortar. Decayed wooden pillars, beams and rafters were replaced by new wooden members of local wood. The old swollen mud plaster of the outer walls was removed and fresh mud plaster in two coats applied in conformity with the original plaster. The leaking roofs of the *Gumphas* were watertightened by removing a layer of the earth to reduce the load and fresh layer of earth laid. The surface of the roof has been plastered with mud. The tops of the walls have been pointed in cement mortar mixed with colouring pigment and watertightened. Cement concrete *khuras* and wooden *parnalas* were provided for the drainage of water from the roof (pl. LXXVII).

The loose and dislodged stone work of the front wall of the Du-khang Ningpa was demolished and the wall reconstructed in cement mortar. The fallen plaster of the walls was removed and replastered with mud mortar mixed with *bhusa* in two coats of 25 mm thickness. The plastered surface of the walls has been washed with Spituk clay to give the old colour in tune with the original work. The cracks of the walls were opened and stitched after grouting the holes and hollows with liquid cement mortar. Cement concrete was provided in the foundation of the sinking walls after supporting the roof and walls very carefully. The top of the parapet has been watertightened with mud plaster. The fallen plaster of the internal walls of the *gumpha* was also restored.

188. OLD CASTLE AT LEH, DISTRICT LEH.—Repairs to the old castle at Leh has been attended for the first time and the fallen portion of the retaining wall supporting the fortification wall of the castle was reconstructed in cement mortar after clearance of fallen debris. Pointing was done on the outer surface of the sunken wall.

189. BUDDHIST MONASTERY (CHAMO), LEH, DISTRICT LEH.—Damaged and worn out mud plaster of the outer walls of the monastery was completely removed. Joints of the stone work were raked and surface replastered with mud mortar mixed with *bhusa* in conformity with the original mud plaster.

190. GONG-KHANG, PHYANG, DISTRICT LEH.—The damaged outer walls were repaired and surface replastered with mud mortar after removing the old swollen plaster and raking out the joints of brick work. The surface was colour-washed with local colour in conformity with the existing colour wash. The damaged portion of the parapet on the roof was reconstructed with mud bricks as per original construction (pls. LXXVIII and LXXIX).

191. BUDDHIST SITE, HARWAN, DISTRICT SRINAGAR.—The reclamation of ancient Buddhist *chaitya* buried under the huge boulders and debris due to cloud burst has been carried out by removing the debris and huge boulders by manual labour on the upper terrace of the site. The work is in progress.

192. KATHI DARWAZA, SRINAGAR, DISTRICT SRINAGAR.—Fallen portions of the rubble stone walls on the roof of the Kathi Darwaza were restored in conformity with the original work and the roof watertightened by laying cement lime concrete, after removal of accumulated earth, vegetation-growth and fallen debris. Repairs to the ceiling of the Darwaza were also carried out. The dead mortar was removed from the joints of the rubble stone work and fresh lime *surkhi* concreted mortar filled in the joints and recess pointed in conformity with the original work. Missing ashlar stone slabs of the veneer work on the rear side of the Darwaza have also been restored, matching with the adjoining ashlar stone.

193. SANGEEN DARWAZA, SRINAGAR, DISTRICT SRINAGAR.—Portion of outer walls on the rear side and fallen patches of wall of the Sangeen darwaza were restored and surface was pointed with lime *surkhi* concreted mortar after raking and washing out the joints thoroughly.

194. GROUP OF TEMPLES AT WANGATH (NARANAG), DISTRICT SRINAGAR.—Debris accumulated on the pillared hall has been removed and part of the plan of the pillared hail exposed.

195. PATHAR MASJID, SRINAGAR, DISTRICT SRINAGAR.—The flooring of the prayer hall of the Mosque was relaid with fine dressed stone slabs in cement mortar after removing the modern brick flooring. Damaged walls and landing of the main entrance of the mosque on the river side was repaired as per the original by replacing the damaged stones with new stone work in cement lime mortar.

196. SIVA TEMPLE, PANDRETHAN, DISTRICT SRINAGAR.—The water tank around the sanctum of the temple was provided with dry stone patching on two sides of the temple in order to check the erosion of the soil from the sides of the tank.

197. DEVI BHAGWATI TEMPLE, BABORE, DISTRICT UDHAMPUR.—The superstructure of the main shrine of the temple was watertightened by filling the joints of the stone with cement

lime mortar mixed with colouring pigment matching with shade of the stone after removing the vegetation growth and dead mortar from the joints of the stone work.

198. KALA DERA TEMPLE 1, BABORE, DISTRICT UDHAMPUR.—One of the dislodged and out-of-plumb walls of the *mandapa* of the temple was dismantled and reconstructed with old stones and new stones in replacement of decayed stones in cement lime mortar.

199. KALA DERA TEMPLE 2, BABORE, DISTRICT UDHAMPUR.—One of the dislodged and out-of-plumb walls of the *mandapa* of the temple was dismantled and reconstructed in replacement of decayed stone in cement lime mortar.

200. GROUP OF TEMPLES AT KRIMCHI, DISTRICT UDHAMPUR.—The dislodged and out-of-plumb wall of the southern side of the platform of Temple no. 1 was dismantled and reconstructed with ashlar stone work in cement mortar after providing cement concrete in foundation. Part of the stone flooring of the platform has also been relaid after dismantling the sunken stone flooring and providing base concrete.

North-eastern wall of the *mahamandapa* of Temple no. 2 was dismantled and reconstructed after replacing the decayed stone blocks by new chisel dressed stone blocks in conformity with the original stone work. The top of the *mandapa* walls has been watertightened by filling the joints with liquid cement mortar. The sunken stone flooring of the *mandapa* has been reset after dismantling the stone slabs, levelling and consolidating the underlayers. Besides, decayed large stone pillars, beams and lintels have also been replaced by new ones with original motifs and moulded work.

Part of the entire dislodged superstructure of Temple 3 was dismantled and reconstructed by using the dismantled original stone blocks and new chisel dressed stone blocks in replacement of decayed stones. Missing stone blocks have also been provided. The work is in progress.

201. ANCIENT FORT AT RAMNAGAR, DISTRICT UDHAMPUR.—The cracked outer walls of one of the eastern bastions of the fort were opened and stitiched with chisel dressed stones in lime cement mortar and surface of the wall pointed with lime *surkhi* mortar in conformity with the original construction (pls. LXXX and LXXXI).

202. NAWA MAHAL, RAMNAGAR, DISTRICT UDHAMPUR.—Fallen walls on the rear side of the Mahal were restored with chisel dressed stone work and brick work in lime cement mortar in conformity with the original work after removing the fallen debris (pl. LXXXII).

203. OLD PALACE, RAMNAGAR, DISTRICT UDHAMPUR.—The leaking roofs of two *dalans* on the top floor of the palace were watertightened by laying concealed reinforced cement concrete slabs after removing the decayed lime concrete and vegetation growth, keeping the decayed painted wooden rafters and planks of the ceiling undisturbed. The surface of the roof will be provided with lime concrete in conformity with the original surface of the roof.

204. SAMADHI OF QUEEN OF RAJA SUCHET SINGH, RAMNAGAR, DISTRICT UDHAMPUR.—The long platform in front of the *samadhi* was reconstructed with chisel dressed stones in lime cement mortar after dismantling the fallen walls of the platform and removal of the accumulated debris.

Punjab

205. FORT, BHATINDA, DISTRICT BHATINDA.—The debris of the fallen inner fortification wall of the western side of the rampart was removed and the fortification wall reconstructed with

lakhauri bricks in lime mortar in conformity with the original construction. Besides, the sunken and leaking brick pavement of the terrace of southern rampart was dismantled and reset. The entire surface of the southern terrace has been watertightened by grouting and pointing the surface in cement mortar.

The damaged and sunken brick pathway of the fort near the main gate has been relaid after removing the damaged bricks and providing base concrete.

206. SHAMSHER KHAN'S TOMB, BATALA, DISTRICT GURDASPUR.—The protected area of the monument has been fenced with barbed wire and steel gate provided for the entry in order to check the encroachments and ingress of cattle.

The debris of the fallen plinth on the eastern side of the tomb was removed and a portion of the wall reconstructed with *lakhauri* bricks in cement lime mortar. Missing parapet walls on the roof of the entrance of the tombs were restored with *lakhauri* bricks in cement lime mortar and tops of parapet watertightened.

207. DAKHNI SARAI, DAKHNI, DISTRICT JULLUNDUR.—Extensive repairs were carried out to the fallen and missing patches of *lakhauri* brick-work of the enclosure walls of the Sarai. The brick work has been restored in lime *surkhi* mortar matching with the original brickwork.

208. MUGHAL BRIDGE AT DAKHNI, DISTRICT JULLUNDUR.—The fallen brickwork of the piers and arches of the bridge has been restored with country brickwork in cement lime mortar. The work is in progress.

209. HAJI JAMAL'S TOMB, NAKODAR, DISTRICT JULLUNDUR.—The fallen and swollen plaster of the high plinth walls on the three sides of the tomb was completely removed and surface replastered with lime *surkhi* mortar after raking and washing out the joints thoroughly.

210. KOS-MINARS AT UPALA AND VEER PIND, DISTRIGT JULLUNDUR.—The fallen patches of the brickwork were restored with country brickwork. Recessed pointing has been done with lime *surkhi* mortar to the area involved.

211. WESTERN GATE OF NOOR MAHAL SARAI, NOOR MAHAL, DISTRICT JULLUNDUR.—The fallen, dislodged and missing patches of brickwork of the gate and adjoining walls have been restored with *lakhauri* brickwork in lime *surkhi* mortar.

SOUTHERN CIRCLE

Kerala

212. FORT ST. ANGELO, CANNANORE, DISTRICT CANNANORE.—The tops of the bastions on the south-east and south-west corners were rendered watertight.

213. MATTANCHERRI PALACE, COCHIN, DISTRICT ERNAKULAM.—The saline-affected surfaces of the interior and exterior walls were provided with a coat of water-proof cement paint of ivory white colour.

214. ST. FRANCIS CHURCH, COCHIN, DISTRICT ERNAKULAM.—The interior of the Church was provided with a coat of water-proof cement paint of ivory white colour after scraping and finishing the old and saline-affected surface.

215. FORT, PALGHAT, DISTRICT PALGHAT.—In continuation of the previous year's work *(1977-78,* p. 124) the fallen and loose portions of the fort wall were underpinned. The brick masonry work of the upper half of the wall was plastered after attending to patch repairs (pl. LXXXIII).

A drain to divert the stagnated water from the Sub-Jail kitchen was constructed with an outlet at the base of the exterior of the fort wall.

Pondicherry

216. PANCHANADISVARA TEMPLE, TIRUVANDARKOIL, DISTRICT PONDICHERRY.—The extant portion of the damaged plinth of the Amman shrine was dismantled, sorted and restored according to the original design.

217. VARADARAJAPERUMAL TEMPLE, TRIBHUVANAI, DISTRICT PONDICHERRY.—The recently exposed basement masonry was taken down and reset into original position.

Tamil Nadu

218. IRAVATANESVARA TEMPLE, KANCHIPURAM, DISTRICT CHINGLEPUT.—The beautiful sculptures on the external wall remained covered under a thick coat of lime mortar. The work of removing the lime mortar is in progress (pl. LXXXIV).

219. KAILASANATHA TEMPLE, KANCHIPURAM, DISTRICT CHINGLEPUT.—The southern, eastern and the northern side walls of the forecourt enclosing the Mahendravaramesvara shrine was dismantled and restored after strengthening the foundation. The broken lintels were repaired by inserting copper rods in addition to the use of epoxy resin. The joints of the masonry, after restoration, were sunk pointed and the butteress supports removed. In the cloister sub-shrine the Kiratarjuniya panel was relieved of the accretionary plaster and finished by modelling (pl. LXXXV).

220. MUNKUDUMISVARA TEMPLE, P. V. KALATHUR, DISTRICT CHINGLEPUT.—The leaking terrace of the front *mandapa* was watertightened.

221. KANTHALINGESVARA TEMPLE (LESSER SIVA TEMPLE), TENNERI, DISTRICT CHINGLE-PUT.—The *mukhamandapa* was dismantled leaving the heavy stone beam spanning the breadth of the *mandapa.* The pipal tree was cut and the *mandapa* was re-erected after strengthening the none-too-strong foundation (pi. LXXXVI).

The cornice or *kapota* stones and the *vyalavari* course above were specially made and placed in the missing gaps. Only the outline of the *kudu* motifs on the cornice and plain moulded stones in the place of *vyalavari* courses were reproduced.

In addition to restoration of the *mandapa,* the disturbed flooring of the *garbhagriha* as well as the *antarala* and the *mandapa* were relaid. The missing approach flight of steps on the eastern side was restored including placing of the *nandi* in its original place. The eastern main door opening was provided with a pair of temple-type doors and the *dvara-palas,* which were removed from their original places, were restored to their proper place.

222. CHENNARAYAPERUMAL TEMPLE, ADIYAMANKOTTAI, DISTRICT DHARMAPURI.—The roof of the large pillared *mahamandapa,* depicting *Ramayana* and Visvarupa of Vishnu, was badly leaking affecting the paintings. The roof terrace of the *mandapa* therefore was relieved of the dead concrete and was rendered watertight to save the paintings on the ceiling.

The thick coat of lime on stone walls of the temple was removed and a stone apron provided all round.

223. BLOCK XXXVI, OLD OFFICERS' MESS (HOUSING THE FORT MUSEUM), FORT ST. GEORGE, MADRAS, DISTRICT MADRAS.—The roof terrace of the large hall housing the gallery displaying paintings was rendered watertight. On the western side of the building a stone apron was provided to prevent entry of rain water into the foundation.

The portion of the building, housing the laboratory of the Chemistry Branch, was provided with a thermocole false ceiling. The damaged flooring was relaid.

224. CLIVE'S BUILDING, FORT ST. GEORGE, MADRAS, DISTRICT MADRAS.—The damaged portions of the ceiling was repaired.

225. CHOLESVARA TEMPLE, MELPADI, DISTRICT NORTH ARCOT.—The accumulated earth around the Cholesvara temple was removed. The damaged flooring of both the *mandapa* and the cloister was removed and relaid. The accretionary brick structures over the roof were removed, (pls. LXXXVII and LXXXVIII).

226. SOMESVARA TEMPLE, MELPADI, DISTRICT NORTH ARCOT.—The work of resetting the out-of-plumb veneer stones in their original position and core-filling is in progress.

The roof of the *kalyana mandapa* as well as that of front *gopuradvara* were water tightened. While doing so one of the broken stone beams and a pillar capital in the *kalyana mandapa* were replaced with new ones in conformity with the original.

The accumulated earth in front of *gopuradvara* was removed and the sunken court was exposed. The sides of the sunken court were provided with dry stone pitching and a drain pipe connecting with the road side drain was laid at the floor level.

Sculptures which were lying loose were fixed on masonry pedestals inside the cloister *mandapa* of" the second *prakara.* A teakwood temple-type door was provided to the opening of the second *gopura.*

227. CHANDRAMAULISVARA TEMPLE, NATTERY, DISTRICT NORTH ARCOT.—The dumped earth on the western side of the *gopura* and the eastern side of the main temple was removed. In order to ensure the safety of the loose sculptures and to prevent the misuse of the interior of the temple, a grilled door was provided for the *garbhagriha* and the *mahamandapa.*

Watertightening of the roof terrace of the *mandapa* of the Chandra Prabha temple is in progress.

228. SUBRAHMANYASWAMI TEMPLE, VALLIMALAI, DISTRICT NORTH ARCOT.—The accretionary structures in the outer court near the *balipitha* and *dvajasthambha* as well as inside the *mandapa* were removed and the area provided with flagstone flooring. Similarly, the floor of the *mandappalli* was relaid.

229. SIKHANATHASWAMI TEMPLE, KUDUMIAMALAI, DISTRICT PUDUKKOTTAI.—The work of reconstruction of the fallen portions of the *prakara* wall is in progress.

232. FORT, ATTUR, DISTRICT SALEM.—The damaged portions of the inner face of the walls of the magazine building were underpinned, using bricks in combination mortar to match with the original. The mud floor of both the granary and the magazine was laid with concrete.

231. FORT, GINGEE, DISTRICT SOUTH ARGOT.—The vaulted roof of the granary inside Rajagiri was watertightened. The roof terrace over the pillared hall and the *mandapa* of the Ranganatha temple was rendered watertight. The sunken floor in front of the porch was relaid. The damaged and weather-worn out portion of the *chhajja* on the northern face of the Kalyana-mahal was made good. The broken lintel beam of the *mandapa* along the flight of steps in the middle of Krishnagiri was replaced with new beam and the accretionary support removed. In continuation of the previous year's work *(1977-78,* p. 127) the work of restoring the fallen portion of Krishnagiri fort was continued. The out-of-plumb southern side wall of Siva temple was taken down and reset.

232. VENKATARAMANA TEMPLE, FORT, GINGEE, DISTRICT SOUTH ARGOT.—In continuation of the previous year's work *(1977-78,* p. 127), the repairs to the north-east corner *mandapa* was continued.

The roof of the large multi-pillared *mandapa* in the second *prakara* was rendered watertight (pl. LXXXIX). Similarly, the roof of the second *gopura* was also watertightened.

233. AIRAVATESVARA TEMPLE, DARASURAM, DISTRIGT THANJAVUR.—The work of preserving the damaged stucco figures on the Rajagopuram of the temple by way of filletting, edging and modelling was completed.

234. SIVAGANGA LITTLE FORT, THANJAVUR, DISTRICT THANJAVUR.—The breached portions of the fort-wall were restored.

235. BRIHADISVARA TEMPLE, GANGAIKONDACHOLAPURAM, DISTRICT TIRUCHCHIRAPPALLI.—The damaged portions of the brick-lined well within the *prakara* of the temple were underpinned.

SOUTH-EASTERN CIRCLE

Andhra Pradesh

236. FORT AND MAHALS, CHANDRAGIRI, DISTRICT CHITTOOR.—After dismantling the damaged gate pillar and heavy sized stones, the pillar was given support in reinforced rubble masonry and reconstructed matching the original structure. The fallen portion of the retaining wall on the eastern side of the ancient tank was reconstructed, using the old stones The heavy jungle along the fort walls was cleared and tree-killer applied for arresting the regrowth.

237. RANGINI MAHAL, GURRAMKONDA, DISTRICT CHITTOOR.—The stone revetment on the southern side of the Rangini mahal was pointed with cement mortar.

238. SHRI KODANDARAMASWAMY TEMPLE, VONTIMITTA, DISTRICT CUDDAPAH.—After dismantling the bulged stones from the outer side of the inner *prakara* wall, the wall was reconstructed using the same stones in combination mortar. The cracks in the roof of each *mandapa* were grouted.

239 FORT, GOLCONDA DISTRICT HYDERABAD.-The stone slabs at the main entrance were reset and the restoration of the stucco work was completed. The work of laying the floor, point ing and watertightening of the Silaikhana was completed. Pointing work was taken up at various places of the fort walls.

240. CHARMINAR, HYDERABAD, DISTRICT HYDERABAD.—The damaged lime plaster on the top of the south-eastern main arch was relaid and the missing floral designs of stucco work restored with mortar combination, matching with the original.

241. SANGAMESWARASWAMY TEMPLE, KUDAVELLI, DISTRICT MAHBUBNAGAR.—Jungle growth all around the temple was removed. The silted *prakara* walls were completely exposed. Modern structures on the *prakara* alignment in front of the temple were dismantled to expose the original ancient *prakara* walls. The dismantling work is in progress.

242. RANGANAYAKULA TEMPLE, UDAYAGIRI, DISTRICT NELLORE.—The debris lying between the main temple and the inner *prakara* wall was cleared and the basal mouldings exposed.

SOUTH-WESTERN CIRCLE

Goa, Daman and Diu

243. MONUMENTS AT OLD GOA.—The leakage in the roof of the Se Cathedral Church and St. Assissi Church was arrested by providing G.I. sheets and Mangalore tiles. The bulged out stone pillars on the top of Bom Jesus Church were dismantled and reset. The weathered stone were removed and replaced with R.C.C. following the original feature.

Maharashtra

244. SAIABAT KHAN'S TOMB, MEHAKARI, DISTRICT AHMEDNAGAR.—The approach road from the foot of the hills to the top was repaired by filling the depressions.

245. MONUMENTS, GHOTAN, DISTRICT AHMEDNAGAR.—The top of Bali and Jatashankara temples was exposed and watertightened by laying cement concrete and the surface plastered, duly toned to match the original.

246. ROCK-CUT CAVES, AJANTA, DISTRICT AURANGABAD.—The facade of Caves 9 and 25 was projected in reinforced cement concrete to divert rain water away from the entrance.

247. BIBI-KA-MAQJBARA, AURANGABAD, DISTRICT AURANGABAD.—Decayed plaster of the northern side citadel wall was removed and plastered. The damaged portion of Hathidhav was constructed as per the original.

248. ROCK-CUT CAVES, AURANGABAD, DISTRICT AURANGABAD.—Modern stone masonry pillars were dismantled and reconstructed in R.C.C. in tune with the original.

249. DAULATABAD FORT, DAULATABAD, DISTRICT AURANGABAD.—The Saraswati Bawadi was desilted. The fallen portion of the retaining wall was restored in keeping with the original.

250. ROCK-CUT CAVES, ELLORA, DISTRICT AURANGABAD.—The disintegrated portion of the rocky surface over Caves 10, 11, 30 A, 32 and 33 was chiselled off and concrete was pro vided to prevent the percolation of stagnated water.

The broken pillars of Cave 27 were reconstructed in R.C.C. matching the original.

251. ELEPHANTA CAVES, GHARAPURI, DISTRICT KOLABA.—The work of terracing from Cave 1 to the visitor pavilion and from Caves 2 to 4 is in progress.

252. RAIGAD FORT, RAIGAD, DISTRICT KOLABA.—The cracks in the side walls of Hathi tank were grouted, and bottom concreted and plastered to stop the leakage of water.

253. KOPESWAR MAHADEV TEMPLE, KHIDRAPUR, DISTRICT KOLHAPUR.—The work of providing an underground drain for draining out the rain water is in progress.

254. PANHALA FORT, PANHALA, DISTRICT KOLHAPUR.—The work of removing decayed lime concrete and laying fresh concrete in the monument, Saraswati, was taken up. The work is in progress.

255. SHIVNERI FORT, JUNNAR, DISTRICT PUNE.—The reconstruction of the fallen portion of the fortification-wall near Shivai temple and Delhi gate is in progress.

256. CAVE TEMPLES, KARLA, DISTRICT PUNE.—The construction of a rain water storage tank is in progress. The fallen retaining wall was restored.

257. SHANWARWADA, PUNE, DISTRICT PUNE.—A wooden railing was provided along the edge of Pushkarni. The portraits of Peshwas who ruled from Shaniwarwada were refixed in the Rang Mahal.

258. DHABOL MOSQUE, DHABOL, DISTRICT RATNAGIRI.—The removal of decayed lime concrete for relaying fresh concrete is in progress.

259. CAVES KAZI, PANHALA, DISTRICT RATNAGIRI.—The clearance of debris and exposing the caves and sculptures are in progress.

260. BASSEIN FORT, BASSEIN, DISTRICT THANA.—Vegetation from inside and outside the fortification was removed.

WESTERN CIRCLE

Goa, Daman and Diu

261. FORT WALL, DAMAN, DISTRICT DAMAN.—Thick vegetation from the entire fort wall was removed. The cavities were filled up with toned mortar. Repairs to the dilapidated fallen masonry and underpinning to overhanging portion were carried out.

Gujarat

262. MOSQUE OF BALAL KHAN GHAZI, DHOLKA, DISTRICT AHMADABAD.—The out-of-plumb wall of the mosque was dismantled and reset to plumb in lime cement mortar in keeping with the original (pl. XC).

263. MANSUR TALAV AND SHRINES, VIRAMGAM, DISTRICT AHMADABAD.—The collapsed walls and disturbed shrines around Mansur Talav were reset as per the original.

264. DWARKADHISH TEMPLE, DWARKA, DISTRICT JAMNAGAR.—Weathered and the cracked stone members of the northern and the southern parts are being replaced by new ones. This work is in progress.

265. TRIVIKRAMJI AND DEVKIJI TEMPLES, DWARKA, DISTRICT JAMNAGAR.—Weathered stones and cracked pillars, lintels, etc. were removed carefully with the help of screw jack and chain pulley, and were replaced by new ones, dressed and carved, in the similar pattern. Repairs to Devkiji Temple are in progress.

266. RAVELI MASJID, MANGROL, DISTRICT JUNAGADH.—The spongy old lime plaster of the walls was removed, redone in lime cement mortar and finished as per the original. The damaged portion of the roof was repaired and made watertight.

267. RANI-KI-VAV, PATAN DISTRICT MAHESANA.—Restoration of the fallen masonry on the flanks of the wall is in progress.

268. SHEIKH FARID DARGAH AND RAUZA, PATAN, DISTRICT MAHESANA.—-The missing pavement of the floor was restored.

269. AJPAL KUND, VADNAGAR, DISTRICT MAHESANA.—Fallen compound wall was restored in brick masonry with plaster in lime mortar as per original. The missing stones of Ghat and pavement were provided over lime mortar bed with recess pointing.

270. ENGLISH AND DUTCH TOMBS, SURAT, DISTRICT SURAT.—The surface of walls, pillars and the flooring was replastered in lime mortar with proper finish keeping in with the original after removal of the old spongy plaster. The roofs were also made watertight (pl. XCI). The dilapidated and fallen portions of the compound walls were reconstructed m accordance with the original pattern.

271. OLD ARMENIAN TOMBS, SURAT, DISTRICT SURAT.—-The spongy old and peeled off plaster of many of the tombs in this group was removed and fresh coats of lime cement mortar plaster was given to match with the original. The entrance gate was repaired laying fresh layers of concrete and plaster. The roofs of the tombs were rendered watertight.

Rajasthan

272. NILKANTHA MAHADEO TEMPLE, ARTHUNA, DISTRICT BANSWARA.—Many cracked stone members i.e. lintels, pillars, balustrades and of roof *kakshasana,* etc. are replaced by new ones, duly dressed in keeping with original ones. The work is in progress. The ashlar stone masonry members of the Siva temple were reset in cement mortar. The damaged floor pavement was reset (pl. XCII).

273. SIVA TEMPLE NO. 2, ARTHUNA, DISTRICT BANSWARA.—The slabs of the missing floor were provided over a bed of cement concrete.

274. MAHAKAL AND TWO OTHER TEMPLES, BIJOLLA, DISTRICT BHILWARA.—The missing pavement was laid over lime cement concrete with proper slope.

275. FORT, CHITTAURGARH, DISTRICT CHITTAURGARH.—The fort walls were cleared from the growth of vegetation, big trees and thorny bushes. The fallen portion of the fort wall near Badal mahal was restored in lime cement mortar.

276. KUKUTESHWAR MAHADEO TEMPLE, CHITTAURGARH, DISTRICT CHITTAURGARH.—The out-of-plumb wall around the temple was dismantled and reconstructed in lime cement mortar. The missing flooring stones were replaced and old ones reset. The walls were also underpinned.

277. SIVA TEMPLE AND NURSERY, CHITTAURGARH, DISTRICT CHITTAURGARH.-—Dismantling and resetting of the out-of-plumb stone masonry, restoration of the missing portion of *sabha-mandapa,* replacing stones wherever necessary were carried out.

278. TOWER OF VICTORY, CHITTAURGARH, DISTRICT CHITTAURGARH.—Missing flooring of the Sati Gate area was restored in keeping with the original.

279. MONASTERY, MENAL, DISTRICT CHITTAURGARH.—Decayed plaster from walls, etc. was removed and redone with fresh lime cement mortar. The leaky roofs were rendered watertight. The missing portions of masonry of various types, viz. in brick and ashlar were restored.

280. FORT, RANTHAMBHOR, DISTRICT SAWAI MADHOPUR.—An approach road linking Badal Mahal to *dargah* and other monuments within the fort was laid.

281. KUMBHALGARH FORT, KUMBHALGARH, DISTRICT UDAIPUR.—The dilapidated steps of the entrance Golerao temple no. 13 were reset in lime cement mortar. The decayed concrete from the roof was relaid in patches and made watertight. The damaged masonry of the high plinth was restored.

282. HIRA BHAGOL GATE, DABHOI, DISTRICT VADODARA.—The out-of-plumb bastion wall of the gate in ashlar masonry was dismantled and reset to plumb in keeping with its original character.

283. EXCAVATED SITE, KARVAN, DISTRICT VADODARA.—Temple 1 of the excavated site was watertightened after carefully taking out couple of brick layers of exposed walls and base ments, etc. and resetting them in lime cement mortar with very fine recess pointing using similar mortar.

MONUMENTS MAINTAINED BY THE STATES

HARYANA

1. BIMA-DEVI TEMPLE, PINJOR, DISTRICT AMBALA.—The area around the temple was fenced with barbed wire provided with angles of iron. A large number of sculptures including those of Vishnu, Surya, Siva, erotic figures, etc., and a plinth of a temple, built of stones, were exposed while clearing the debris around the temple.

2. TOMB OF SHEIKH TAYAB, KAITHAL, DISTRICT JIND.—A platform was built around the tomb and the protected monument was cleaned.

3. CHHATA RAI BAL MUKAND DAS, NARNAUL, DISTRICT MAHINDERGARH.—The cavities in the southern wall of the monument were underpinned, and the overhanging portion of the eastern wall was strengthened. The vegetational growth around the monument was removed.

4. CHOR GUMBAF, PIR TURKMAN AND TRIPOLIA GATE, NARNAUL, DISTRICT MAHINDERGARH.—The vegetational growth around these monuments was removed and the outer platform at Chor Gumbaz was relaid.

KARNATAKA

The Department of Archaeology and Museums, Government of Karnataka, carried out conservation work on the following monuments.

5. BOULDER INSCRIPTION NEAR KADUMALLESWARA TEMPLE, MALLESWARAM, DISTRICT BANGALORE.

6. FORT, BASAVAKALYAN, DISTRICT BIDAR.

7. JAMI MASJID, SHAH BAZAR, DISTRICT GULBARGA.

8. SRI KESHAVA TEMPLE, HARANAHALLI, DISTRICT HASSAN.

9. SRI LAKSHMINARASIMHASWAMY TEMPLE, HOLENARASIPUR, DISTRICT HASSAN.

10. SHANTINATHA BASTI, JINANATHAPURA, DISTRICT HASSAN.

11. SRI YOGANARASIMHASWAMY TEMPLE, MUDUGERE, DISTRICT HASSAN.

12. LAKSHMIKANTHASWAMY TEMPLE, KALALE, DISTRICT MYSORE.

13. TRINAYANESWARA TEMPLE, MYSORE DISTRICT MYSORE.

MADHYA PRADESH

14. CHHATTRASAL AND KAMLAPATI MABARA, MAU (DHUBELA), DISTRICT CHHATARPUR.—The decayed concrete flooring of the second storey was conditioned.

15. GUJARI MAHAL, GWALIOR, DISTRICT GWALIOR.—The buttress wall of the fortification was restored and the monument was rendered watertight.

16. SHAHJAHAN MAHAL, GWALIOR, DISTRICT GWALIOR.—The flagstone flooring was conditioned.

17. FORT, BIJAIRAGHOGARH, DISTRICT JABALPUR.—Thick vegetational growth over the wall as well as inside the fortification around the ruins was cleared.

18. JOGIABABA TEMPLE, DITHWARA, DISTRICT JABALPUR.—In the course of debris clearance, a plinth of a brick temple assignable to the fourth-fifth century A.D., was exposed. The top course of the structure was watertightened and the site was provided with barbed wire fencing.

19. MOTI MAHAL, RAMNAGAR, DISTRICT MANDLA.—In the course of debris clearance, remains of a fountain cistern were exposed in the courtyard of the Mahal.

20. SUN TEMPLE, REHLI, DISTRICT SAGAR.—The fallen portions of the walls were restored and the decayed concrete flooring was conditioned.

21. FORT, NARWAR, DISTRICT SHIVPURI.—The bulged out portions of the walls were restored.

PUNJAB

22. AM KHAS BAGH, SIRHIND, DISTRICT PATIALA.

UTTAR PRADESH

23. VALMIKI ASHRAM, BITHOOR, DISTRICT KANPUR.—Development of garden, construction of a brick-built well and a tube-well were completed.

24. TIKAIT RAI SIVA TEMPLE, BITHOOR, DISTRICT KANPUR.—All the walls were repaired as per the original. The original stairs and the *ghat* around the temple were conditioned.

25. PISHANARIN-KA-MATH, GHATAMPUR, DISTRICT KANPUR.—Basement with all side stairs and walls were repaired. The area around the temple was levelled by filling the ditches and dressing. The joints in the brick walls and the flooring were recess pointed.

26. EXCAVATED SITE, SONKH, DISTRICT MATHURA.—Top of the exposed walls was made watertight and the foundation of the structures were strengthened by underpinning with cement concrete. The apsidal temple at the mam site was covered by a 4-m high tubular truss shade with vaulted roof and terracotta titles.

27. KUSUM SAROVAR AND CHHATRIS, MATHURA, DISTRICT MATHURA.—The area around the *chhatris* and *sarovar* was levelled and dressed. Flower beds around the *chhatris* were developed. The approach path from the main road to *chhatris* was improved.

X. ARCHAEOLOGICAL CHEMISTRY

TREATMENT OF MONUMENTS AND PAINTINGS[1]

ANDHRA PRADESH

1. GOLCONDA FORT, GOLCONDA, DISTRIGT HYDERABAD.—The armoury i.e., ten cannon, 25 cannon-balls, 20 rifles and two mortars, from the fort was preserved after chemical treatment by 15% sodium hydroxide solution, sodium potassium tartarate etc. Carvings and floral designs on objects were also exposed to view. The treated objects were preserved by polyvinyl acetate in toluene and acetone in 3:1 respectively.

2. RAMAPPA TEMPLE, PALAMPET, DISTRICT WARANGAL.—The vegetational growth, lime-wash and bat's excreta lying on the carvings and walls of the temple were cleaned by 10% ammonium hydroxide, teepol and 5% glacial acetic acid. Approximately one-fifth of the work has been done and the reset is to be carried out in the next year.

BIHAR

3. MURAL PAINTINGS AT SARAI MOUND, NALANDA, DISTRICT NALANDA.—The mural paintings at Sarai mound were cleaned with the help of organic solvents and preserved with polyvinyl acetate. The work of chemical treatment of remaining paintings on the side walls would continue.

DELHI

4. BHADON PAVILION, RED FORT, DELHI.—The pavilion, made of marble, was covered with dust, dirt and greasy matters and these were removed by using a mixture of one per cent ammonia solution and lissapol powder. To remove the stains, solvents like toluene xylene and dioxane were used. Two per cent of hydrogen peroxide (20 volumes) was also applied for the removal of adamant stains. The work is in progress.

5. MARBLE THRONE IN DIWAN-I-AM, RED FORT, DELHI.—The throne, a raised platform made of marble, has a canopied roof supported by four pillars. Both the canopy and the eastern wall of the platform are well decorated with coloured floral designs, and the throne itself was covered with dust and dirt. As the place is visited daily by large number of visitors, the marble surface became greasy and as a remedial measure the surface was first made free from dust and dirt by using soft brush and then the marble surface was washed with one per cent of ammonia and lissapol powder to remove the greasy stains. For adamant stains two to five per cent hydrogen peroxide was used. Some greasy patches were removed by solvents e.g. toluene, xylene, benzene etc. This work is in progress.

6. RANG MAHAL, RED FORT, DELHI.—The lime wash covering the walls and ceilings of the arches of the eastern wall was removed by moistening with five per cent solution of glacial

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[1]Information from Director (Science) of the Chemistry Branch of the Survey except no. 12 which was received from Department of Archaeology, Haryana.

acetic acid, which softens the lime coat. It was then scrapped with stainless steel scalpel till the paintings surface was noticed. Finally, the surface was gently rubbed by turpentine to remove the loosened lime wash. The process was repeated till the painted surface was visible. After exposing the paintings, solvents like methanol, acetone, cellulose, methyl, ethyl, butyl lactate, etc. are being used for the removal of accretions.

7. SAWAN PAVILION, RED FORT, DELHI.—The monument, made of marble, has inlay work on the walls. As it was covered with dust, dirt and greasy matters, it was treated with one per cent ammonia solution and lissapol powder using soft brushes. The treated area was washed with water in order to remove the last traces of chemicals used. For the removal of adamant stains, solvents like methanol, toluene and xylene were used. For the removal of dark stains, two per cent hydrogen peroxide (20 volumes) was also applied.

8. ARAB-KI-SARAI, NEW DELHI.—The paintings on the posterior half in the Arab-ki-Sarai's interior remained covered under a lime wash coat. Dust, dirt, smoke, insect nests, etc. were also observed on the painted surface. In the first step when the work commenced the paintings were made visible by chemico-mechanical means followed by treatment with organic solvents like triethanolamine, alcohol, butyl lactate, xylene, carbon tetra chloride, etc. for the removal of superficial accretions. Finally, the paintings were preserved by 5% poly vinyl acetate solution (in toluene). Broken edges were filled with plaster of paris.

9. JAMALI KAMALI, NEW DELHI.—The interior of Jamali Kamali containing colourful tile work, paintings and beautiful carvings was covered with dust, dirt, greasy matters, oil stains and pencil marks, besides deposits of salts and insect nests. Insect nests were removed by soaking them with solvents like toluene, carbon tetra chloride, etc. followed by gentle scrapping. The soot deposits were removed with the help of mixture of triethanolamine and alcohol and the paintings were treated with solvents like benzene, acetone, xylene, alcohol, etc. The marble surface was cleaned by two per cent of ammonia and lissapol. All the treated area was finally preserved by five per cent solvent of polyvinyl acetate (in toluene).

10. NILA-GUMBAZ, NIZAMUDDIN, NEW DELHI.—The walls of the north gates, north-west and north-east gates of Nila-gumbaz have tile-work while the walls of the niches bear paintings. The entire area had a blackish appearance due to the growth of thick layers of moss over it. This apart, some miniature plants had grown from joints at the top of the wall. Moreover the paintings were covered with dust and dirt; some cracks had also developed in them. The vegetational growth was removed by using two per cent ammonia solution with the help of soft brushes, and to remove traces of chemicals the treated area was washed with water. Thereafter the paintings were treated with solvents e.g. methanol, toluene, xylene, acetone, etc. The side wall adjoining the ceiling seems to contain paintings now covered under the coating of lime-wash and steps have been taken to expose them by erecting scaffoldings.

GUJARAT

11. SUN TEMPLE, MODHERA, DISTRICT MAHESANA.—-The cleaning of Sun temple by removing adamant stains, moss, lichen, dust and dirt by ammonia teepol mixture is in progress.

HARYANA

12. TEJA SINGH SAROVAR, REWARI, DISTRICT MAHINDERGARH.—The smoke stains noticed on the paintings on the surface of the inner dome were removed by the use of chemicals.

KARNATAKA

13. RAVAN PHADI CAVES, AIHOLE, DISTRICT BIJAPUR.—The facade of the cave was covered by moss and lichen growth, which was removed by applying ammonia teepol solution while zinc silicofluoride was used as fungicidal and polyvinyl acetate as preservative. The paintings on the ceiling were cleaned by solvents and preserved by polyvinyl acetate.

14. BADAMI CAVES, BADAMI, DISTRICT BIJAPUR.—The paintings in the cave nos. 2 and 3 which were covered by dust, dirt and varnish had to be treated chemically by morpholine, cellosolve, triethanolamine, rectified spirit, butyle lactate etc. and then preserved by polyvinyl acetate in toluene. Furthermore, the bulging portion of painted plaster was fixed by tinted plaster of paris.

15. PATTADAKKAL GROUP OF TEMPLES, PATTADAKKAL, DISTRICT BIJAPUR.—The stone surface of three temples here—Jambulingesvara, Kadasiddesvara and Mallikarjuna—was covered with vegetational growth, dust and dirt and these were removed by ammonia teepol mixture, while zinc silicofluoride was applied as fungicide. Finally the preservation was done by polyvinyl acetate in toluene.

16. HOYSALESVARA TEMPLE, HALEBID, DISTRICT HASSAN.—The carvings and sculptures of the temple were covered with vegetational growth and lime wash on an area of 2410 sq. m of which an area of 1996 sq. m has been treated so far. The vegetational growth was removed by ten per cent ammonia solution, adamant stains by deoxidine solution, lime wash by five per cent glacial acetic acid, followed by fungicidal application with one per cent sodium pentachlorophenate. Finally, it was preserved by two per cent perspex solution in toluene.

17. CHENNAKESAVA AND NAGESVARA TEMPLE, MOSALE, DISTRICT HASSAN.—Thick deposits of moss and lichen, deposited salt etc. on carvings, sculptures and floral patterns were removed by using ten per cent ammonia solution and also by five per cent aquous oxalic acid. Afterwards, one per cent sodium pentachlorophenate was applied as fungicidal. Finally, these were preserved by two per cent perspex solution in toluene.

18. PAINTINGS IN DARIA DAULAT BAGH, SRIRANGAPATNA, DISTRICT MANDYA.—The painted areas and Gallaries 1 to 7 in the first floor of Daria Daulat Bagh was taken up for filleting and edging, which will be followed by colour matching work.

MADHYA PRADESH

19. ADINATH TEMPLE, KHAJURAHO, DISTRICT CHHATARPUR.—Thick lime layer patches were present inside the grooves and were removed mechanically as well as chemically, the latter by means of two to three per cent of solution of acetic acid. Further, many fragile stones of this temple were strengthened and preserved.

20. CHATURBHUJA TEMPLE, KHAJURAHO, DISTRICT CHHATARPUR.—The chemical cleaning of both the inside and outside of the temple is complete. The inside area and a portion of the southern side along with the western side is to be preserved with a fungicidal coating by zinc-silicofluoride and finally with a polyvinyl acetate coating.

21. CHITRAGUPTA TEMPLE, KHAJURAHO, DISTRICT CHHATARPUR.—The work of chemical treatment for the removal of dried black patches of moss and lichen was continued. At certain

places thick patches of lime wash had to be carried out both mechanically and chemically. The chemically cleaned area has been given the fungicidal treatment and preserved with polyvinyl acetate coating.

22. DULADEO TEMPLE, KHAJURAHO, DISTRICT CHHATARPUR.—The chemical treatment and preservation work of this temple except its northern side has been completed (pl. XCIII).

23. BAGH CAVES, BAGH, DISTRICT DHAR.—With the help of chemical treatment in the caves old and thick layers of cow dung, plaster, dirt, dust, smoke, tarry matter have been removed carefully; as a result, floral designs in colour, and some sculptures have been exposed. Cracks in sculptures and interior of caves were filled in with the help of synthetic adhesives and stone powder and repaired.

24. NILAKANTHESVARA TEMPLE, UDAIPUR, DISTRICT VIDISHA.—The work of chemical cleaning of black moss and lichen and the growth of fungus has been completed. A fungicidal coat with zinc-silicofluoride was given and then preserved with a coating of polyvinyl acetate.

MAHARASHTRA

25. AJANTA CAVES, AJANTA, DISTRICT AURANGABAD.—Chemical treatment and preservation of paintings in Ajanta caves was continued during the period under review. In Cave no. 6 the existing paintings in the walls and ceiling of Buddha shrine had already been freed from accretions in the preceding year and this year the work was taken up in the antechamber and the north wall of the central hall. The paintings on mud plaster in these locations were completely hidden by thick accretions of soot, age-old varnish associated with dust and dirt and so on. The accretions were satisfactorily removed, exposing human and animal figures, figures of Buddha and other motifs in bright colours. Some inscriptions were also made visible with the help of suitable chemicals. Photographic documentation of all the work was also done to have a clear picture of the scientific work done in this Cave. Besides the chemical treatment of the paintings, the consolidation of loose painted and unpainted plaster was also carried out. The loose edges were fixed to the ground and the bulges of the painted plaster were removed by fixing these satisfactorily (pls. XCIV-XCV).

The chemical treatment of paintings in the Cave no. 17 was of a more complicated nature. Several coats of varnish applied over the painted film from time to time had to be removed completely, for any incomplete removal of these accretions would have resulted in the appearance of chalkiness in the course of time. Not only this varnish but also the soot, dust, dirt and excreta associated with it had to be removed for bringing the paintings hidden underneath to view. Furthermore, the accretions were satisfactorily removed from various panels on the walls of west aisle and south aisle, resulting in the uncovering of the hidden figures of human beings, animals, birds, vegetation and other motifs in bright colours. In this Cave also the loose painted and unpainted plaster was consolidated and fixed to the ground. The patches filleted were given colour matching, thereby adding to the beauty of the painted surface.

The reproductions of the paintings prepared by Departmental Artists are displayed in Cave no. 4. These were being affected by insects; hence, proper action was taken for their eradication by using insecticides.

The removal of dust, dirt, cobwebs etc. from the paintings, unpainted plaster and sculptured areas in various caves was continued to check its accumulation.

Recording of temperature and humidity in painted Caves nos. 1,2, 16 and 17 at different locations was also continued in order to have a clear picture of their variations. Moisture content from the plaster and the rock is also being determined from the cells of Cave no. 1.

To check the insect nuisance in Cave nos. 1,2,16 and 17 regular spraying of the insecticide was being carried out. The rubber matting of these cells was also removed and the insecticide solution sprayed on the floor and lower unpainted surface of the pillars.

26. BIBI-KA-MAQBARA, AURANGABAD, DISTRICT AURANGABAD.—The marble *jali* of Maqbara was cleaned by ammonia teepol mixture and hydrogen peroxide for the removal of stains, dust and dirt.

27. ELLORA CAVES, ELLORA, DISTRICT AURANGABAD.—Chemical treatment and preserva tion of the ground floor of the Kailasa temple in Cave no. 16 was continued. Centuries of old vegetational growth, black moss and lichen, accumulation of dust, dirt and the like along with other accretions could be removed satisfactorily and the work in almost half of the area of the temple has been completed. After the removal of these undesirable accretions, the stone surface and sculptures were exposed to their original texture. Consolidation of the loose painted plaster and fixing of bulges in the central hall of the Kailasa temple was completed. The ceiling, pillars and walls of Lankesvara in this Cave were also decorated with paintings, which have suffered enormous loss; the consolidation of their loose edges along with the fixing of the bulges has been taken up.

ORISSA

28. CHITRAKARINI TEMPLE, BHUBANESWAR, DISTRICT PURI.—This is situated on the northern side of the main Lingaraj temple which was covered with the thick growth of vegetation, moss, lichen and the like thus giving a blackish appearance. For the removal of this vegetation and moss two per cent aquous ammoniacal solution was used followed by complete and thorough washing with water. A fungicidal treatment of two per cent zinc-silicofluoride suspension in water was applied for resisting subsequent growth of moss, lichen etc. Two subsidiary shrines treated in the same way in the earlier seasons have successfully withstood the effect of climate with no more regrowth of moss and lichen.

29. JAMESVARA TEMPLE, BHUBANESWAR, DISTRICT PURI.—The temple built on the model of the Konark temple was taken up for chemical treatment and preservation during the year. The entrance to the *jagmohan* of the temple facing east as well as the dome were treated chemically for removal of accretions like dried moss and lichen. For the removal of the black colouration of the stone, special chemicals like aquous solution of methyl carboxy cellulose in conjunction with sodium bicarbonates were tried with little success. Hence, it can be taken that the colouration is due to the change in the structure of the stone surface itself and not due to any accretional growth. However, the work is in progress.

30. MEGHESVARA TEMPLE, BHUBANESWAR, DISTRICT PURI.—The chemical treatment has been carried out by the way of removal of moss and lichen followed by application of fungicide and similar chemicals over the main shrine and the *jagmohan.*

RAJASTHAN

31. CHITRASALA, CHHATAR MAHAL, BUNDI.—The paintings on the ceiling were cleaned by organic solvents for the removal of dust, dirt and oily matters and finally preserved by polyvinyl acetate.

32. TEMPLE AND GATEWAY OF JAGAT SHIROMANI TEMPLE, AMER, JAIPUR.—The gateway of the above temple was covered with moss, lichen and vegetational growth, which were cleaned by detergents and chemicals and finally preserved by polyvinyl acetate^ solution. Similarly, the carvings inside the temple which were covered with dust, dirt and oily matters and thin layer of lime wash were cleaned with organic solvents and preserved with polyvinyl acetate solution.

TAMIL NADU

33. KAILASANATHA TEMPLE, KANCHIPURAM, DISTRICT CHENGLEPUT.—The subshrines having sculptures and carvings were treated chemically for the removal of vegetational growth by ten per cent solution of ammonia and teepol (2:1). The subshrines up to 48 were given fungicidal treatment using one per cent sodium pentachlorophenate in water. Finally, all were preserved by two per cent perspex solution in toluene.

In subshrines 49-52, there was salt (mostly chlorides) deposition, which is being removed by taking the advantage of their solubility in water. Apart from it, the sculptures and carvings of the *vimana* section were treated chemically for the eradication of vegetational growth. Removal of lime wash was done by chemico-mechanical method.

34. GANESA RATHA, MAHABALIPURAM, DISTRICT CHENGLEPUT.—The sculptures and carvings of Ganesa Ratha were covered by moss, lichen and lime wash. Lime wash patches were removed by five per cent aquous glacial acetic acid, moss and lichen by ten per cent ammonia and teepol mixture. The treated area was given fungicidal treatment by one per cent sodium pentachlorophenate. It was then preserved by two per cent perspex solution in toluene.

35. MAHRATHA PAINTINGS, SUBRAHMANYA SHRINE, BRIHADISVARA TEMPLE, THANJAVUR.—On the Mahratha paintings, the work related to fixing of detached painted papers, filling of lacunal, filleting of cracks and edges were executed by the modeller, while retouching work was done by the artist.

36. STUCCO AND PROVISION OF NEW SUPPORT TO NAYAKA PAINTINGS IN CHAMBER 10, BRIHADISVARA TEMPLE, THANJAVUR.—A new fibre-glass support to the stripped Nayaka paintings is to be given. The work is in progress. The work has been initiated during the year under review.

37. BRIHADISVARA TEMPLE, GANGAIKONDACHOLAPURAM, DISTRICT THIRUCHIRAPALLI.—The base of Brihadisvara temple was taken and treated chemically for the eradication of vegetational growth by ten per cent ammonia and teepol solution, the limewash by five per cent glacial acetic acid and adamant stains by five per cent deoxidine solution in water. The work is in progress.

UTTAR PRADESH

38. ARAM BAGH, AGRA, DISTRICT AGRA.—Paintings were exposed after the removal of plaster.

39. CHINI-KA-RAUZA, AGRA, DISTRICT AGRA.—The inner paintings were cleaned by organic solvents for the removal of dust and dirt and finally preserved by with three per cent

polyvinyl acetate solution. The moss and lichen growth over the tiles were cleaned by ammonia solution and then preserved after fungicidal treatment.

40. IT-MAD-UD-DAULA, AGRA, DISTRICT AGRA.—The vegetational growth over the walls was removed by ammonia, followed by the application of wax polish.

41._ TAJ MAHAL, AGRA, DISTRICT AGRA.—The carved lower border and *jalis* were cleaned by organic solvents for the removal of dust and dirt and at the end polished with mension polish.

42. MARYAM'S PALACE, FATEHPUR SIKRI, AGRA.—The dust and dirt inside the palace had been cleaned by organic solvents and preserved finally by polyvinyl acetate solution.

43. TOMB OF TURKISH SULTANA, FATEHPUR SIKRI, DISTRICT AGRA.—All floral carvings and geometrical designs which were covered with thick layer of dust, dirt and algal growth were cleaned with ammonia solution and preserved by polyvinyl acetate solution after fungicidal treatment.

44. TOMB OF SHEIKH SALIM CHISTI, FATEHPUR SIKRI, DISTRICT AGRA.—The paintings below Arabic inscriptions were covered with dust, dirt and greasy matters, and these were cleaned by organic solvents and preserved by polyvinyl acetate solution.

45. TEMPLES IN JAGESWAR, ALMORA, DISTRICT ALMORA.—These temples covered by moss, lichen and algal growth were cleaned by ammonia solution and preserved by polyvinyl acetate solution after fungicidal treatment. This work is in progress.

46. GROUP OF TEMPLES, BAIJNATH, DISTRICT ALMORA.—Vegetations over the temples were cleaned chemically and preserved by polyvinyl acetate.

47. ASVAMEDHA SITES IN JAGATGRAM, KALSI, DISTRICT DEHRA DUN.—Inscriptions which were covered with moss, lichen, algal growth had to be chemically cleaned and preserved by polyvinyl acetate.

48. RANI MAHAL, JHANSI, DISTRICT JHANSI.—The floral designs and paintings of walls of Rani Mahal remained covered under dust and dirt and these were chemically cleaned before their preservation by polyvinyl acetate solution.

49. RUMI DARWAZA, LUCKNOW, DISTRICT LUCKNOW.—The Darwaza having beautiful carvings and architectural designs was covered with vegetational growth which was cleaned partly by chemicals.

50. DHAMEK STUPA, SARNATH, DISTRICT VARANASI.—The carvings on the important Buddhist structure, which was subjected to chemical treatment last year, was under progress in the current year as well. The carvings as well as the whole structure was completely treated with the help of ammoniacal water for removal of moss, acid, lichen along with other accretions. Detergents like lissapol, teepol and the like were used for the removal of dust, dirt and greasy matter. After completion of chemical treatment, a fungicidal coat with zinc-silicofluoride (2-3%) was given to the monument and finally preserved with one per cent solution of poly vinyl acetate.

WEST BENGAL

51. LALJEE TEMPLE, BISHNUPUR, DISTRICT BANKURA.—The exterior portion of the temple, which was subjected to chemical treatment last year, was completely treated and preserved during this year. The superficial deposits viz., moss and lichen etc., had been removed with the help of ammoniacal water and triethanolamine along with other detergents. Finally it was given two per cent fungicidal treatment and then preserved with one per cent solution of polyvinyl acetate.

52. RADHEY SHYAM TEMPLE, BISHNUPUR, DISTRICT BANKURA.—The exterior of the temple was under chemical treatment for removal of thick layer of moss, lichen, soot, dust and dirt. It was completely treated with dilute ammonia solution (2-3%) along with other detergents. After giving fungicidal treatment, the temple was preserved with a coating of a solution (1-2%) of polyvinyl acetate.

53. LOTTON MOSQUE, GAUR, DISTRICT MALDA.—Most of the work of chemical treatment was completed last year and the remaining portion was subjected to chemical treatment during the current year for the cleaning of dust, dirt and soot with the help of organic solvents while the black moss and lichen had been removed by the dilute ammoniacal solution. Afterwards, it was preserved with a solution (1-2%) of polyvinyl acetate.

TREATMENT OF EXCAVATED OBJECTS AND MUSEUM EXHIBITS

SCIENCE LABORATORY, DEHRA DUN

54. Two hundred ninety-two iron, three hundred and five copper and ninety-six lead antiquities and coins were treated. Chemical analysis of the antiquities was carried out by conventional and instrumental means, and after establishing the nature of accretion different types of antiquities were treated by different chemical processes. The iron antiquities were fragile and needed delicate handling. Their cleaning was carried out with kerosene and frequent brushing while petroleum jelly was used as preservative. The copper antiquities were treated by alkaline tartarate method and the fragile copper coins were treated with silver oxide under hundred per cent humidity. In both cases the antiquities were preserved with two to three per cent polyvinyl acetate in toluene. The lead coins had carbonates in the form of accretions arid inscrustation. These were treated with dilute acetic acid (3 to 5%). After thorough washing the coins were preserved with polyvinyl acetate in toluene.

55. The preservation of three Qurans was carried out by the Laboratory. The books were found to be acidic in nature and in a very fragile condition. After deacidification with ammonia vapours the pages of the books were separated from each other by specific chemico-mechanical means (pl. XCVI).

REGIONAL OFFICE LABORATORY, HYDERABAD

56. The Laboratory treated nearly one thousand antiquities received from various offices of the Survey like the Excavations Branch, Nagpur, Mid-Southern Circle, Bangalore, South-eastern Circle, Hyderabad, Southern Circle, Madras, Fort Museum, Madras, and Tipu Sultan Museum, Srirangapatna. Antiquities and exhibits included prints and pencil sketches, copper and silver coins, gold, silver, copper and iron objects, etc.

57. The office of the Assistant Superintending Archaeological Chemist, Madras, chemically treated the marble statue of Lord Cornwallis in the Fort Museum, Madras, for cleaning of dust, dirt and oily substances by a solution of ammonia and teepol and some organic solvents; it has now been preserved.

RESEARCH AND ANALYSIS[1]

58. Chemical analysis of Satanikota soil was continued with a view to finding out if the phosphate estimated in the soil specimens was from animal or vegetable accumulation.

59. Determination of firing temperature of bricks from Kalsi and Ochre-coloured pottery from Sringaverpur was carried out.

60. Petrological studies of two images brought from the headquarters office were carried out.

61. In continuation of the previous work *(1977-78,* pp. 151-52), Professor R. V. Joshi, B. C. Deotare and Shrimati A. A. Kshirsagar, of the Deccan College, Pune, under the UGC Project, 'Chemical Analysis of Archaeological Sites', collected samples of archaeological deposits from Bhimbetka (palaeolithic-mesolithic), Hunsagi (palaeolithic), Inamgaon- (chalcolithic) and analyzed for the elements like phosphorus, nitrogen, carbon etc., besides usual soil characteristics as pH, E. C. Some of the results obtained are given below, indicating human activities at their respective cultural periods:

Inamgaon (Maharashtra)

Culture	*Phosphorus in ppm*	*Nitrogen %*	*Organic Carbon %*	*Calcium Carbonate %*	*Electrical conductivity millimhoscm*	*PH*
1. Late Jorwe	4437	0.104	1.150	12	4-5	7.6
2. Early Jorwe	4875	0-086	0-987	4	4-7	7.7
3. Malwa	3437	0-106	1-323	7	3.3	7.8
4. Non-cultural deposit	625	0.035	0.210	—	5.2	7.6
		Bhimbetka	(Madhya Pradesh)			
5. Upper and Middle Palaeolithic	1310	0.043	0.336	—	0-06	4.5
6. Middle Palaeolithic	1120	0.046	0.289	—	0-08	4.2
7. Lower Palaeolithic	1680	0.019	0.420		0-06	4.1

[1]Information from Director (Science) of the Survey except no. 61 which is supplied by Prof. R. V. Joshi of the Deccan College Post-graduate and Research Institute, Pune.

62. The Chemistry Branch of the Survey has already started work on the collection of data on air pollution and its related aspects. Arrangements are being made to measure the amount of SO_2 present in the atmosphere by lead peroxide candle method. Moreover, steps to measure the amount of particulate matter, relative humidity and temperature etc., have also been initiated.

63. Several experiments on preservation were carried out on their efficacy on the marble surface of the Taj threatned by the effects of pollutants from the Mathura Refinery. The experiments with methyl methacrylate, polyconate and wax polish did not yield satisfactory results. On experimental basis a five per cent solution (W/V) in toluene of polyvinyl acetate was applied on two panels by the brush and the spray techniques. It is found that the spray technique gives better results and coatings are transparent, clear and smooth. As preservative dynaglaze (special) is considered good as it produces good results. Yet the most excellent results have been achieved by the use of dynasylan BSM 40 producing absolutely smooth, clear and transparant surface. The chemical composition of this preservative has been analyzed in the Dehra Dun Laboratory and it is found to be viscous liquid dissolved in ethanol. The solute is found to be of some organic silicate. Further two mixtures of dynasylan BSM 40 and polyvinyl acetate have been tried as follows.—

(a)	Dynasylan BSM 40	50 ml.
	Polyvinyl Acetate	40 ml.
	Toluene	10 ml.
(b)	Dynasylan BSM 40	25 ml.
	Polyvinyl Acetate	40 ml.
	Toluene	35 ml.

The mixture (a) gives excellent results and almost as good as the Dynasylan BSM 40 itself while the other mixture does not appear to be much effective.

XI. ARCHAEOLOGICAL GARDENS[1]

ANDHRA PRADESH

1. ARCHAEOLOGICAL MUSEUM, AMARAVATI, DISTRICT GUNTUR.—The long-pending works relating to the horticultural operation was completed here, one of the items being the installa tion of a suitable pump-set in the newly-sunk bore-well.

2. ARCHAEOLOGICAL MUSEUM, NAGARJUNAKONDA, DISTRICT GUNTUR.—A few lawns which outlived their life had been here returfed.

3. GOLCONDA FORT, GOLCONDA, DISTRICT HYDERABAD.—The work of revival of the Nagina Bagh has been completed and now the landscaping of the outskirts of the Fort and the front part of the Armoury hall has been taken up.

BIHAR

4. EXCAVATED REMAINS AND ARCHAEOLOGICAL MUSEUM, NALANDA, DISTRICT NALANDA.—In order to solve the water scarcity a tube-well was bored last year and it has now been commissioned by installing a vertical turbine pump. Several lawns around the excavated remains had to be returfed. Moreover, the newly-acquired area was landscaped into a fine informal garden though the plantation has yet to be completed.

5. EXCAVATED REMAINS, KUMRAHAR, DISTRICT PATNA.—The rear sector of the garden at the Mauryan palace-site was returfed and some of the shrubberies, where the shrubs had outlived their normal life, were replaced.

6. SHER SHAH'S TOMB, SASARAM, DISTRICT ROHTAS.—The garden was nicely maintained throughout the year.

DELHI

7. RED FORT, DELHI.—As the unfiltered water supply is becoming more and more unsatisfactory in Delhi, the Central Ground Water Board at the request of the Survey has undertaken a survey of the availability of ground water for horticultural operations at different monuments. Though the initial results to sink a tube-well at Red Fort are not encouraging, efforts are still being made for obtaining fruitful results.

8. HUMAYUN'S TOMB, NEW DELHI.—At the recommendation of the Central Ground Water Board, a bore-well was sunk here.

9. JANTAR-MANTAR, NEW DELHI.—An extensive network of pipelines was laid for effective distribution of water with a view to maintaining lawns and gardens.

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[1] Information from the Chief Horticulturist, Gardens Branch of the Survey. During the period under review this Branch maintained seventy-seven gardens, all laid around nationally protected monuments and sites. In the following pages brief reports on the important works of landscaping carried out during the period are given.

10. KOTLA FIRUZ SHAH, NEW DELHI.—The ancient well here was desilted and arrangements were made to drain out excess water during the rainy season.

11. LODI TOMBS, NEW DELHI.—The preliminary work for the returfing of the lawns around the three monuments has been completed.

12. NAJAF KHAN'S TOMB, NEW DELHI.—A bore-well was sunk on the recommendation of the Central Ground Water Board.

13. PURANA QILA, NEW DELHI.—A bore-well was sunk here also to ensure adequate water supply for the maintenance of the lawns and flower beds.

14. QUTB MINAR? NEW DELHI.—In order to ensure regular water supply a submersible pump has been installed in one of the tube-wells.

15. SAFDARJUNG'S TOMB, NEW DELHI.—Because of the high water-table, the gardens and lawns of this monument get inundated in the rainy season. One of the precautionary measures taken is to drain out water from the overflowing well to prevent this water-logging. This was achieved by installing 125 horse-power submershible pump which helps in irrigating the garden during other seasons.

GOA, DAMAN AND DIU

16. ARCHAEOLOGICAL AREA, VELHA GOA, GOA.—The gardens at the churches like the Se Cathedral, Bom Jesus, St. Assisi and others are being maintained in proper condition. As the underlying pipelines of a few fountains here were all corroded these had been provided with leak-proof arrangements by way of replacements of pipes, and replastering of cisterns. They have now started playing satisfactorily and during nights these are also illuminated.

GUJARAT

17.SHAHR-KI-MASJID, CHAMP ANER} DISTRIGT PANCH MAHALS.—The landscaping of the surroundings of the monument has been completed.

18. HAZIRA, VADODARA, DISTRICT VADODARA.—The preparatory cultivation for initiating horticultural operations around the tomb has begun.

JAMMU AND KASHMIR

19. TEMPLES AT PATTAN, DISTRICT BARAMULLA.—The horticultural operation which was under progress during the last year has been completed. In order to have a perennial water supply the work of sinking a tube-well has been entrusted to the Government of Jammu and Kashmir.

KARNATAKA

20. ARCHAEOLOGICAL MUSEUM AND RUINS, HAMPI, DISTRICT BELLARY.—After obtaining the feasibility report from the State Geological Department a tube-well was sunk at the Museum area to overcome the acute shortage of water. Around the temple was undertaken a large-scale horticultural operation.

21. IBRAHIM ROUZA, BIJAPUR, DISTRICT BIJAPUR.—Here also a tube-well was sunk to augment the water supply for carrying out horticultural operation.

21. DARIA DAULAT BAGH, SRIRANGAPATNA, DISTRICT MANDYA.—The work of improving the nursery has been going on to intensify the propagational activities with a view to meeting the increasing demand of the gardens in the South Zone.

22. GUMBAZ, SRIRANGAPATNA, DISTRICT MANDYA.—The formation of a fruit orchard has been taken in hand. A tube-well was also sunk here.

23. KESAVA TEMPLE, SOMANATHAPUR, DISTRICT MYSORE.—The old pump-sets have been replaced to maintain the supply of water to lawns and flower-beds.

MADHYA PRADESH

25. ARCHAEOLOGICAL AREA, KHAJURAHO, DISTRICT CHHATARPUR.—Since the lawns around the temple-group had outlived their life, they were taken up for returfing.

26. HAMMAN, FORT, BURHANPUR, DISTRICT EAST NIMAR.—With a view to ensuring adequate water supply for the maintenance of the garden, the work of sinking a bore-well has been entrusted to Madhya Pradesh Lift Irrigation Corporation.

MAHARASHTRA

27. FORT, SHANWARWADA, PUNE, DISTRICT PUNE.—Besides maintaining the main garden inside in perfect condition, the outskirts of the Fort were landscaped so as to prevent the misuse of land by the public.

ORISSA

28. BHASKARESVARA TEMPLE, BHUBANESWAR, DISTRICT PURL—TO ensure adequate water supply throughout the year the well here has been tapped and the motor pump-set energized. Similar measure was taken for the Meghesvara temple as well.

29. RAJARANI TEMPLE, BHUBANESWAR, DISTRICT PURL—In continuation of the previous year's *(1977-78,* p. 156) programme, the digging of the well had been completed and electric motor installed. Further, a network of the pipelines has been laid for proper water supply. The entire area of horticultural operations has also been fenced.

30. SUN TEMPLE, KONARAK, DISTRICT PURL—The horticultural operation that started last year has been completed.

31. LORD JAGANNATHA TEMPLE, PURI, DISTRICT PURL—For sufficient water supply in the cut flower garden adjoining the temple an ejecto jet pump has been commissioned.

RAJASTHAN

32. DIG-PALACE, DEEG, DISTRICT BHARATPUR.—The orchard at Deeg has recently been taken over and is being reorientated on scientific lines.

UTTAR PRADESH

33. AGRA FORT, AGRA, DISTRICT AGRA.—The Anguri-bagh inside the fort was reorganized and enriched with flora characteristic of the Mughal gardens.

34. ITMAD-UD-DAULA'S TOMB, AGRA, DISTRICT AGRA.—The work of reorientation of the garden, purely on the Mughal pattern, which began last year *(1977-78,* p. 156), has been completed to a great extent.

35. KHAN-I-ALAM NURSERY, AGRA, DISTRICT AGRA.—The rosarium here was renovated and further enriched by fresh varieties.

36. RAMBAGH, AGRA, DISTRICT AGRA.—Excavations have been taken up for exposing the hidden structures for redesigning the garden on the typical Mughal style.

37. TAJ MAHAL, AGRA, DISTRICT AGRA.—A new submersible pump-set has been installed in the tube-well to ensure adequate water supply.

38. FATEHPUR SIKRI, DISTRICT AGRA.—All the old pipelines from the Hakim-baoli have been replaced.

39. ARCHAEOLOGICAL AREA, SAHET AND MAHET (ANCIENT SRAVASTI), DISTRICT GONDA.—The work of fencing the area meant for horitcultural operations is in progress.

40. GANGADHAR RAO'S CHHATRI, JHANSI, DISTRICT JHANSI.—The area around the monument has been taken up for landscaping.

41. ARCHAEOLOGICAL SITES, SARNATH, DISTRICT VARANASI.—-The work of returfing the lawns and enriching the shrubberies is now Over. To overcome the insufficient supply of water to the gardens around the excavated sites a deep well was sunk by the Ground Water Board and this proved to be a success.

XII. PUBLICATIONS

PUBLICATIONS OF THE SURVEY

1. INDIAN ARCHAEOLOGY—A REVIEW.— The issues for 1972-73 and 1973-74 were brought out, and the issue for 1974-75 is in advanced stage of printing.

2. WHEELER MEMORIAL LECTURE SERIES.—*Sir Mortimer and Indian Archaeology* by Grahame Clark is in the final stage of printing.

3. CORPUS INSCRIPTIONUM INDICARUM.—Part II of volume VII of the series, *Inscriptions of Paramaras, Chandellas, Kachchapaghatas and two Minor Dynasties* was printed off while part III is in the press.

4. SOUTH INDIAN INSCRIPTIONS.—The volumes XXII, XXIII and XXIV are in different stages of printing.

5. ANNUAL REPORT ON INDIAN EPIGRAPHY.—The issues for the years 1967-68, 1969-70 and 1970-71 are under print and those for the years 1973-74, 1974-75, 1975-76, 1976-77 and 1977-78 have already been made press-ready.

6. EPIGRAPHIA INDICA.—Parts I and II of the volume XL have been sent to the press.

7. EPIGRAPHIA INDICA—ARABIC AND PERSIAN SUPPLEMENT.—The number for the year 1972 was brought out.

8. GUIDE BOOKS.—*Mahabalipuram* (fourth edition) by C. Sivaramamurti and *Monuments of Kerala* (second edition) by H. Sarkar have been published.

9. PICTURE POSTCARDS.—A set of picture postcards on Belur was reprinted and a new set on Sibsagar (Assam) introduced.

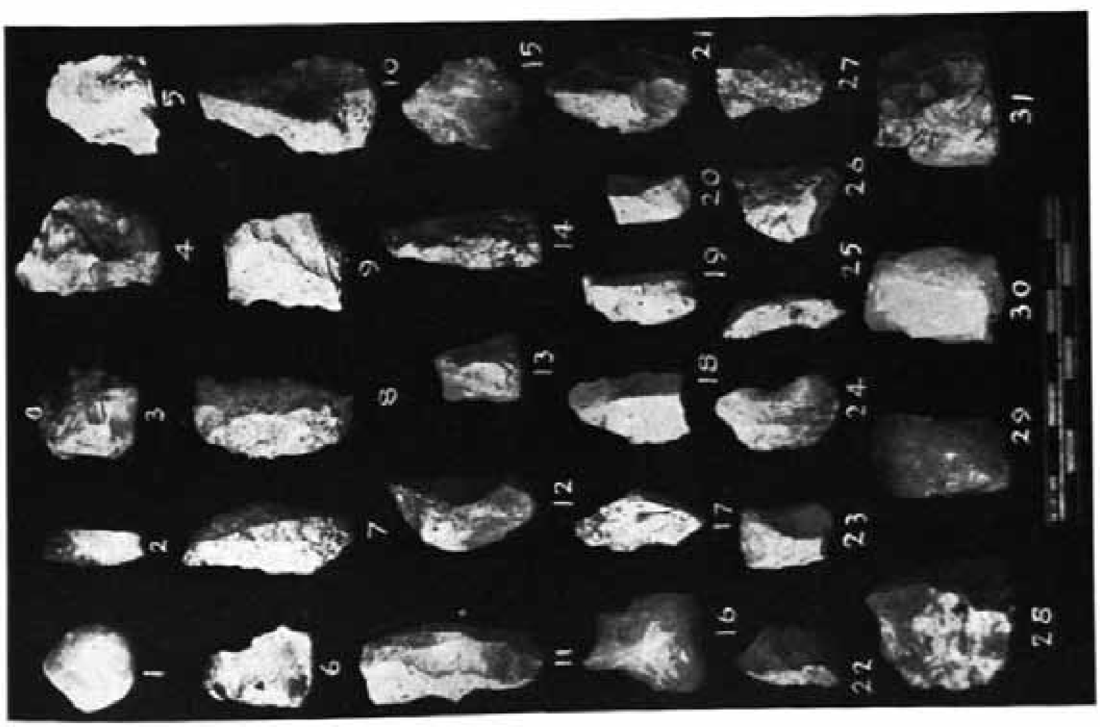
10. ARCHAEOLOGICAL WORKS CODE.—The English version of the revised Code is now under print.

OTHER PUBLICATIONS

ANDHRA PRADESH.—The Department of Archaeology and Museums, Government of Andhra Pradesh, reprinted *Vijayanagara Coins* by N. Ramesan and *Ikshvaku Coins* by R. Subrahmanyam. The *Neolithic Cultures of South-Western Andhra Pradesh* by V. Ramareddi and the *Annual Report for 1976-77* have been published.

ASSAM.—The Department of Archaeology and Museums, Government of Assam, brought out the revised version of the folder of the State Museum.

UTTAR PRADESH.—The Department of Archaeology, Government of Uttar Pradesh, brought out *Rajghat-ki-Mrinmurtiyan* by R. C. Singh.

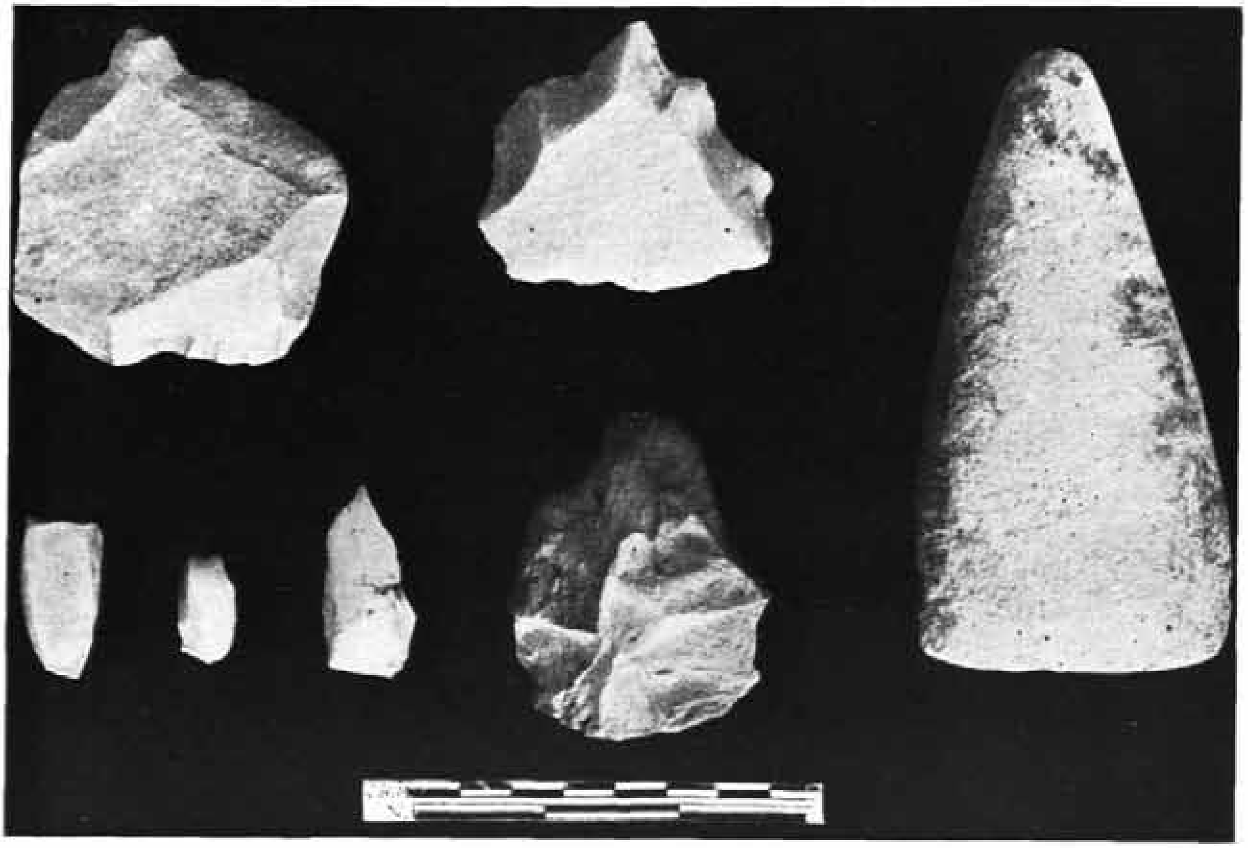


A



B

A, *Raigarh : microliths;* B, *Thirunavaya : menhir.* *See pp. 11 and 27*



A

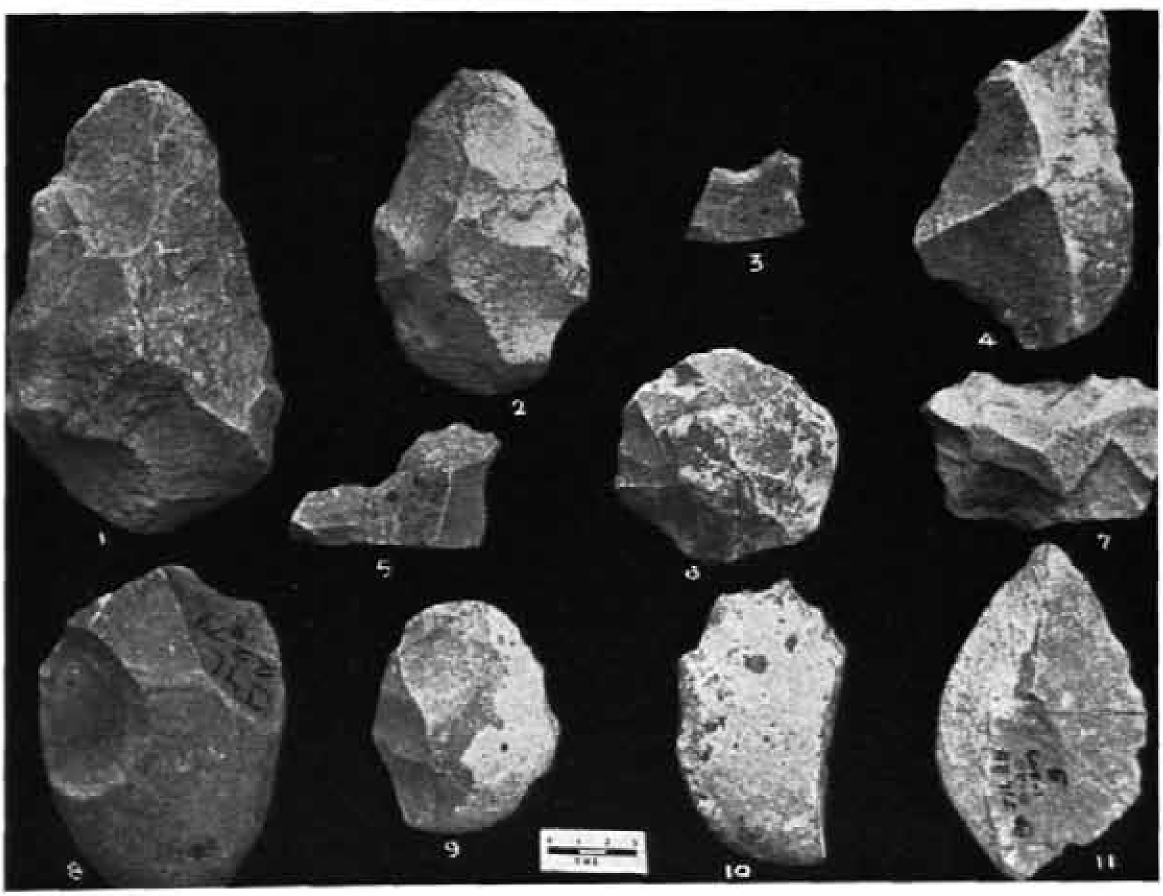


B

A, *Peramanallur* : *Middle Palaeolithic tools and a neolith* ; B, *Tondamanur* : *megalith*. *See pp. 20-21*



A

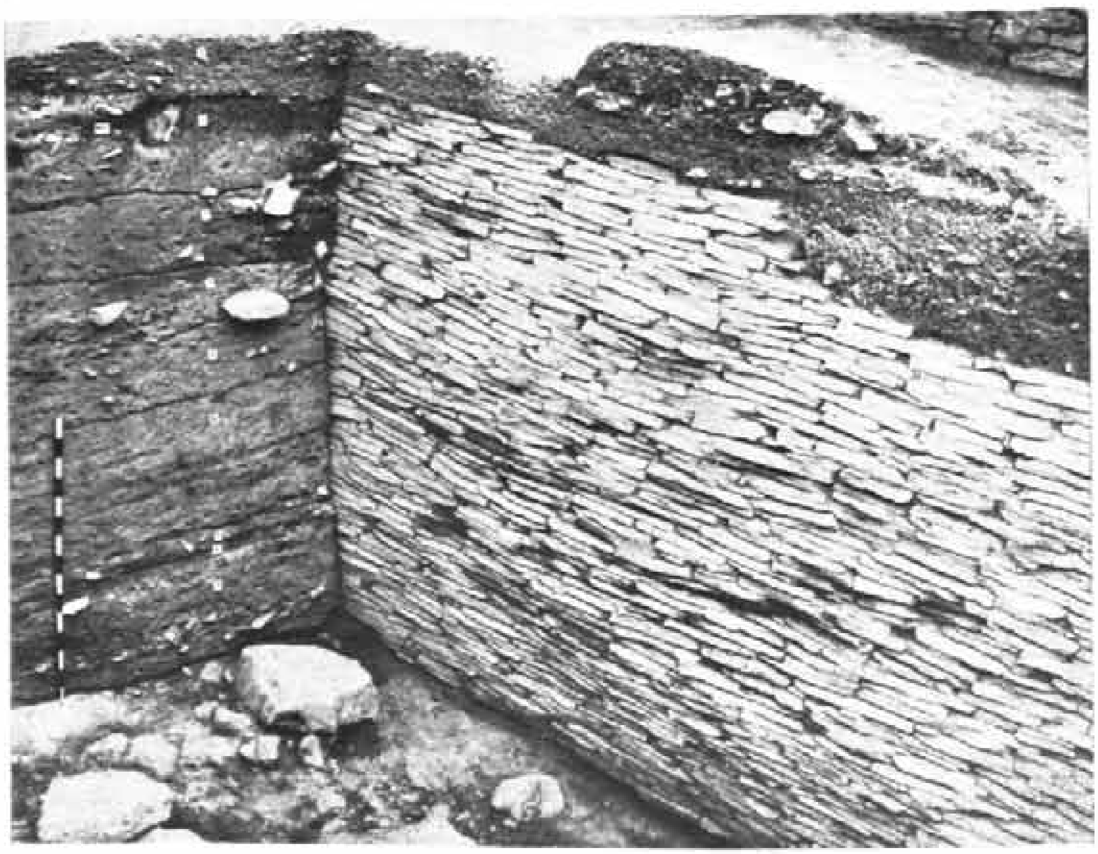


B

A. *Ongallur* : *topikal* ;B. *Jayal* : *palaeoliths*. *See pp. 27 and 33*

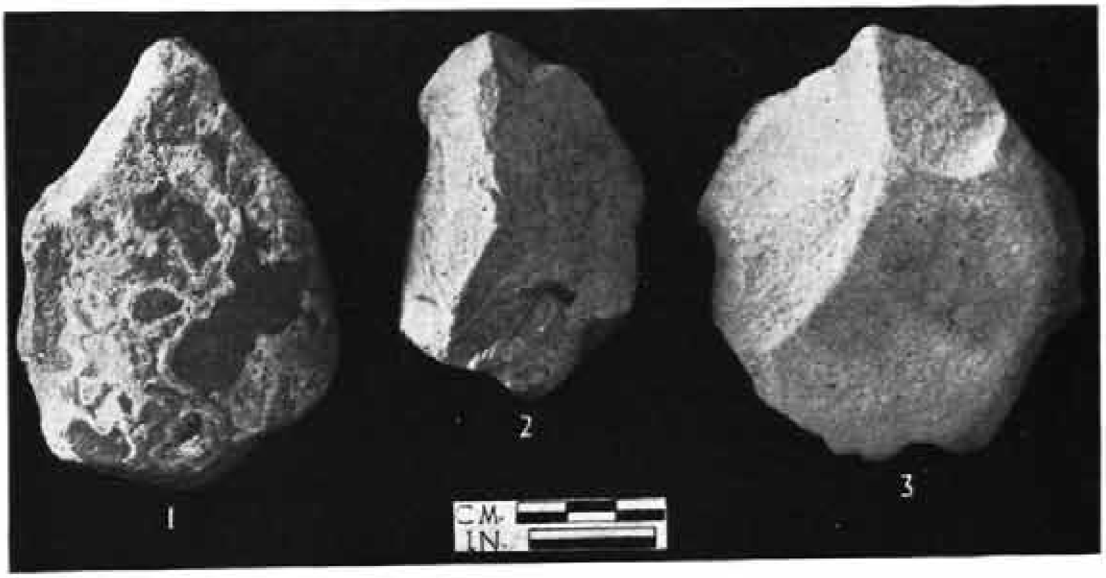


A



B

A, *Garo hills* : *alluvial fills*; B, *Satanikota* : *stone embankment*. *See pp.* 30 *and* 35



A

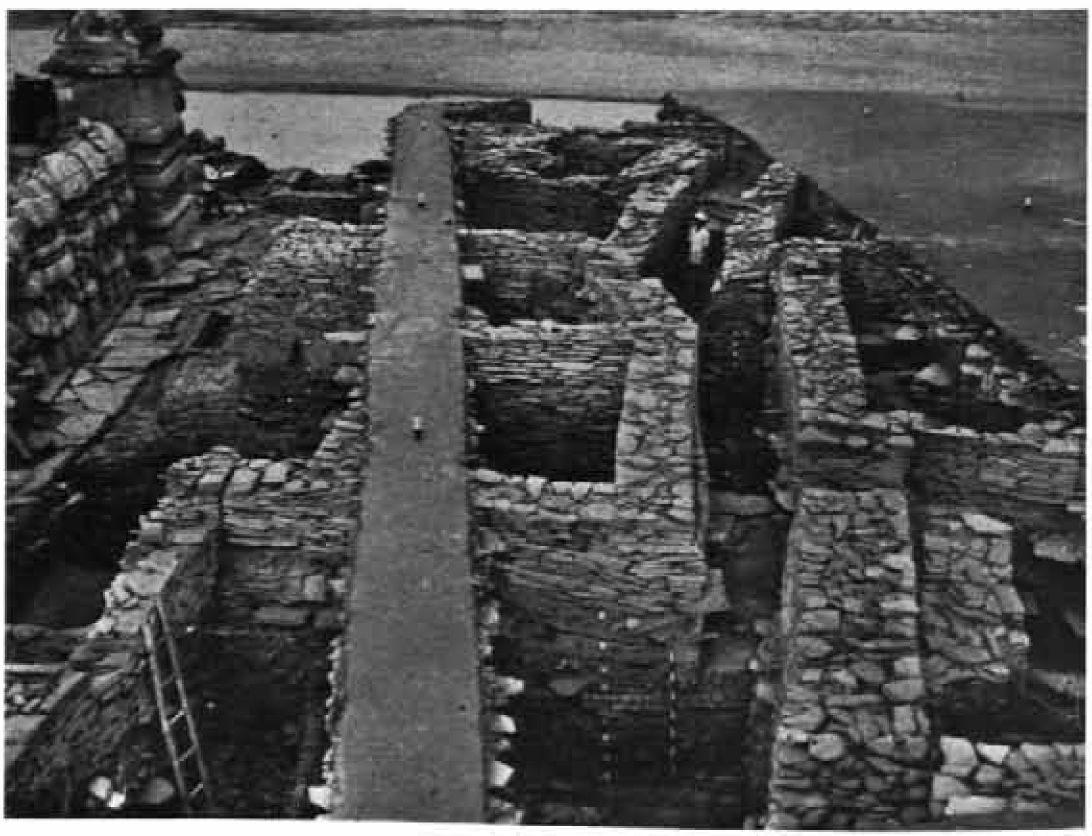


B

A, *Vamulapadu : palaeoliths*; B, *Kudavelli : exposed structure of period I*. *See pp. 35 and 37*



A



B

Kudavelli : view of exposed structures. *See pp. 37 and 41*



A

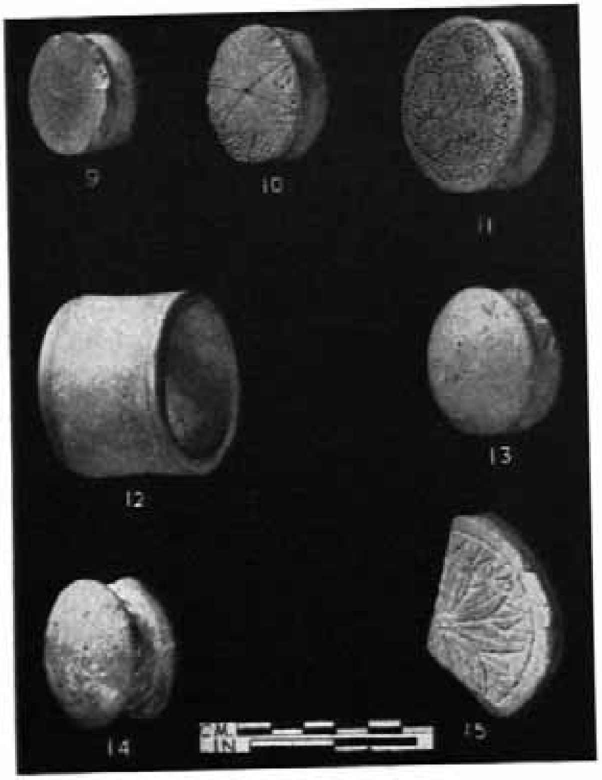


B

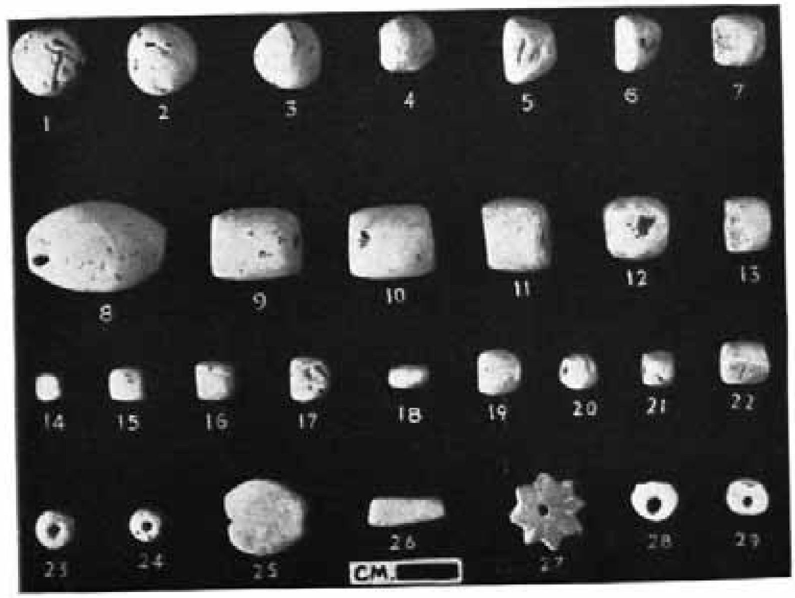


C

Kudavelli : A, gold coins; B, stone plaque depicting female figure; and C, stone plaque with three female figures, surface collection. See pp. 39 and 41



A



C



B



D

Kudavelli : A, *ear ornaments*; B, *seal*; C, *beads*; *and* D, *terracotta ear ornaments*. *See pp. 39 and 41*



A

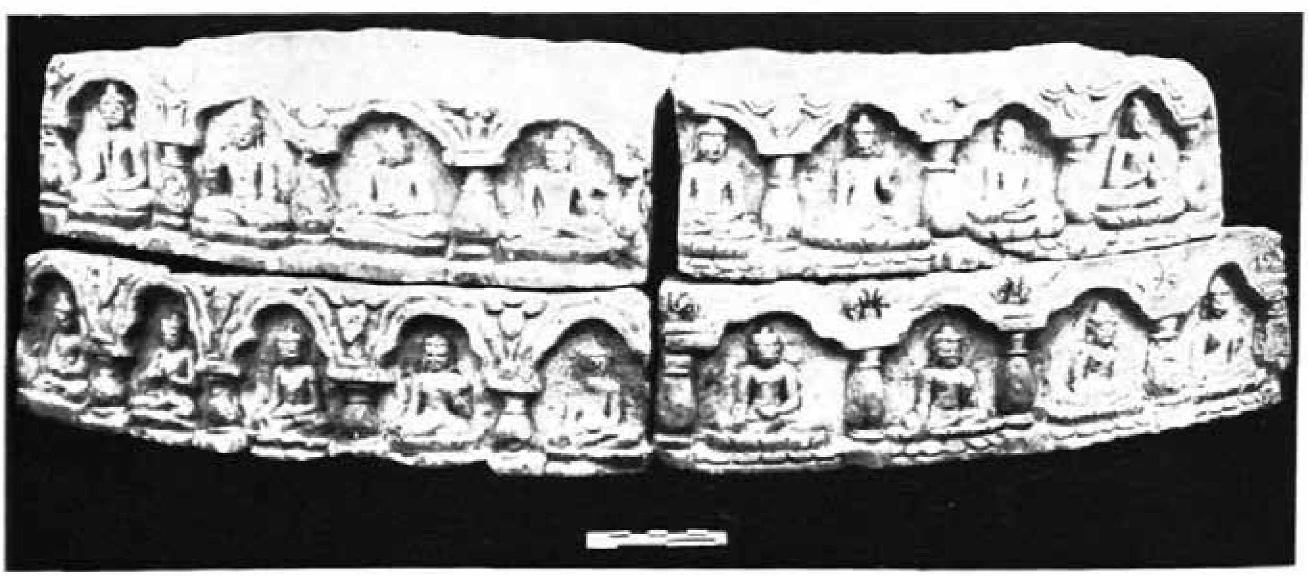


B

Antichak : A, *votive stupas*; B, *stone heads*. *See p. 43*



A



B

Antichak : A, *copper spouted vessel* ; B, *panel depicting images of Buddha*. *See p. 43*



A



B

Hampi : exposed building-complex. *See p. 45*



A



B

Hampi : A, *flight of steps*; B, *remains of stucco figures.* *See p. 45*



A



B

Hampi : exposed structures with stucco figures. *See p. 45*



A



B

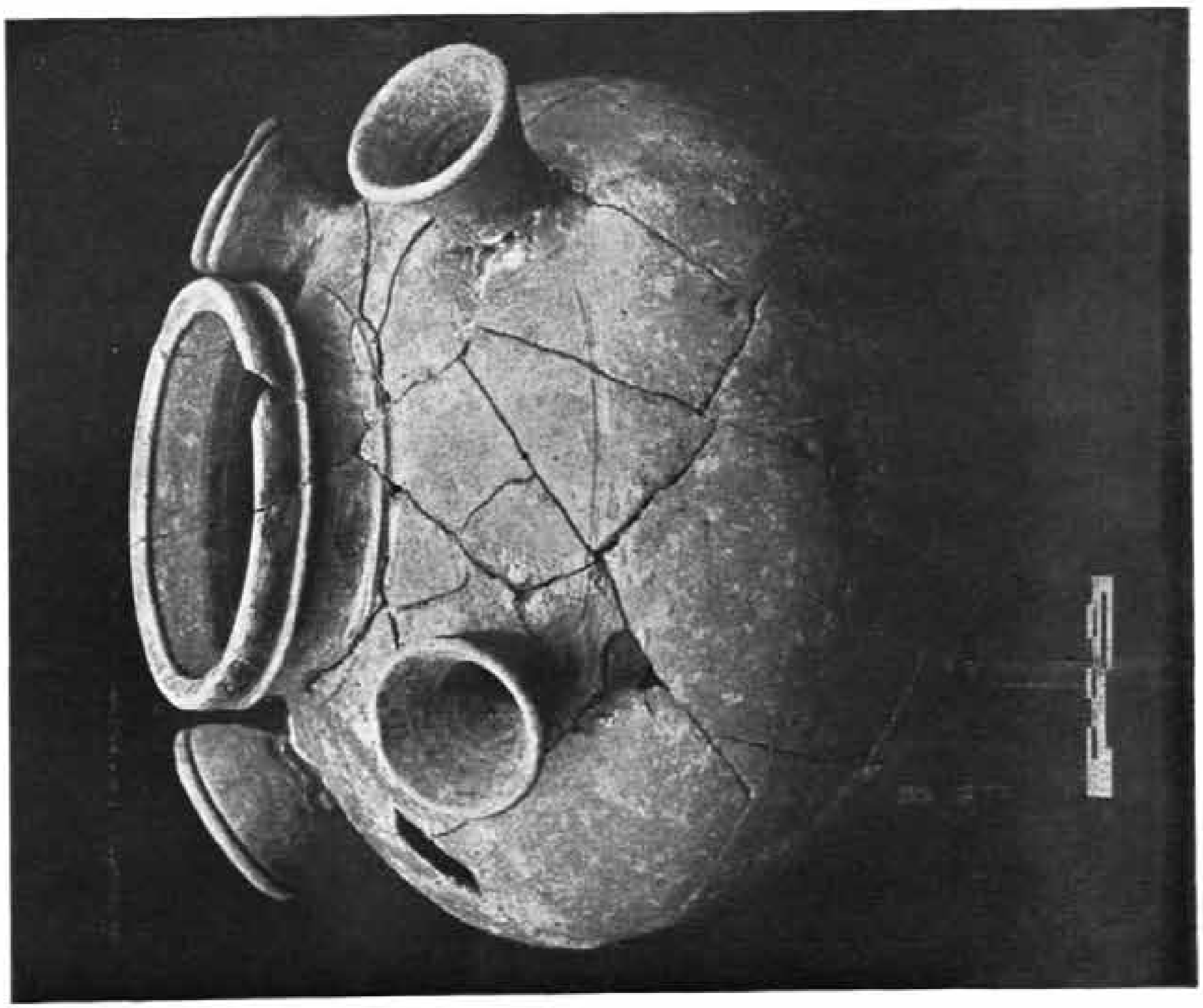


C

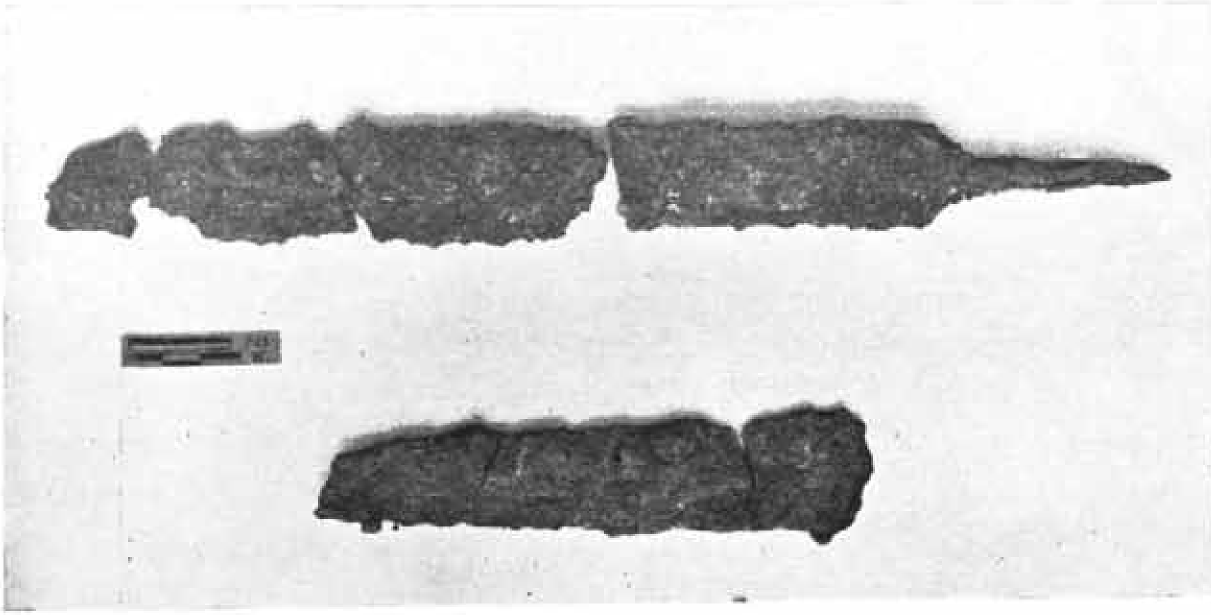


D

Hampi : A, *stone trough*; B, *inscribed China Ware*; C *and* D, *stucco heads*. *See p. 45*

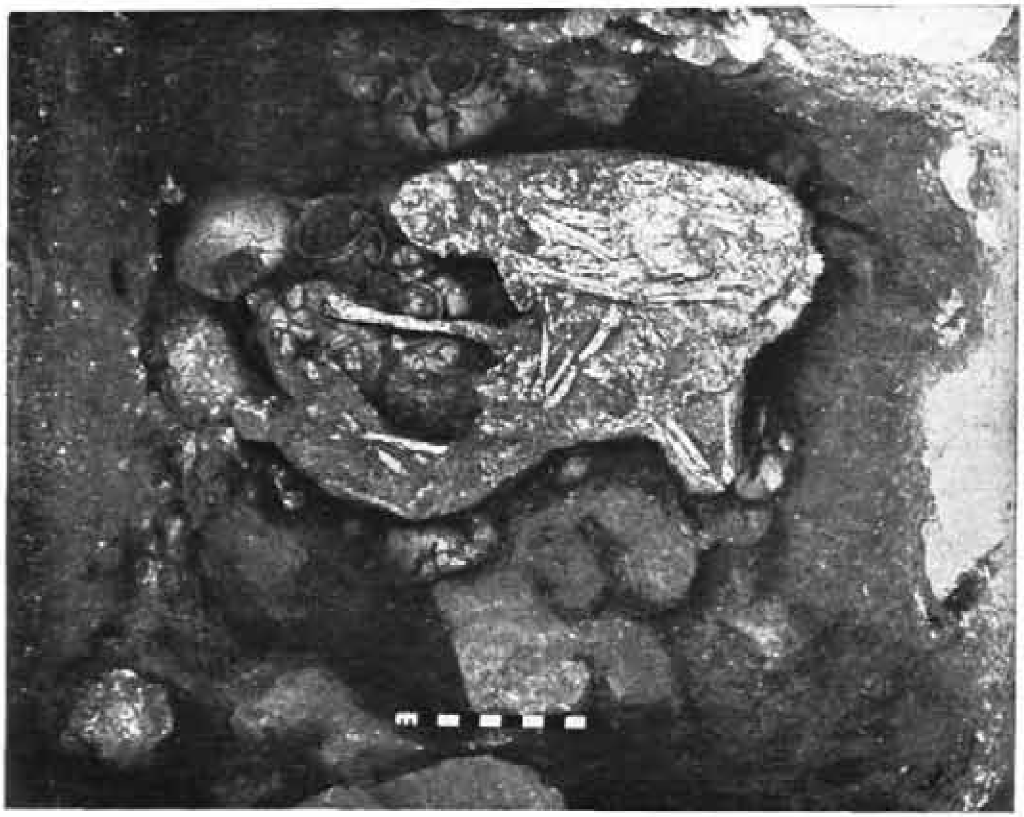


A



B

Tadakanahalli : A, *globular pot with four spouts; and* B, *iron dagger from Megalith I.* *See p. 46*



A

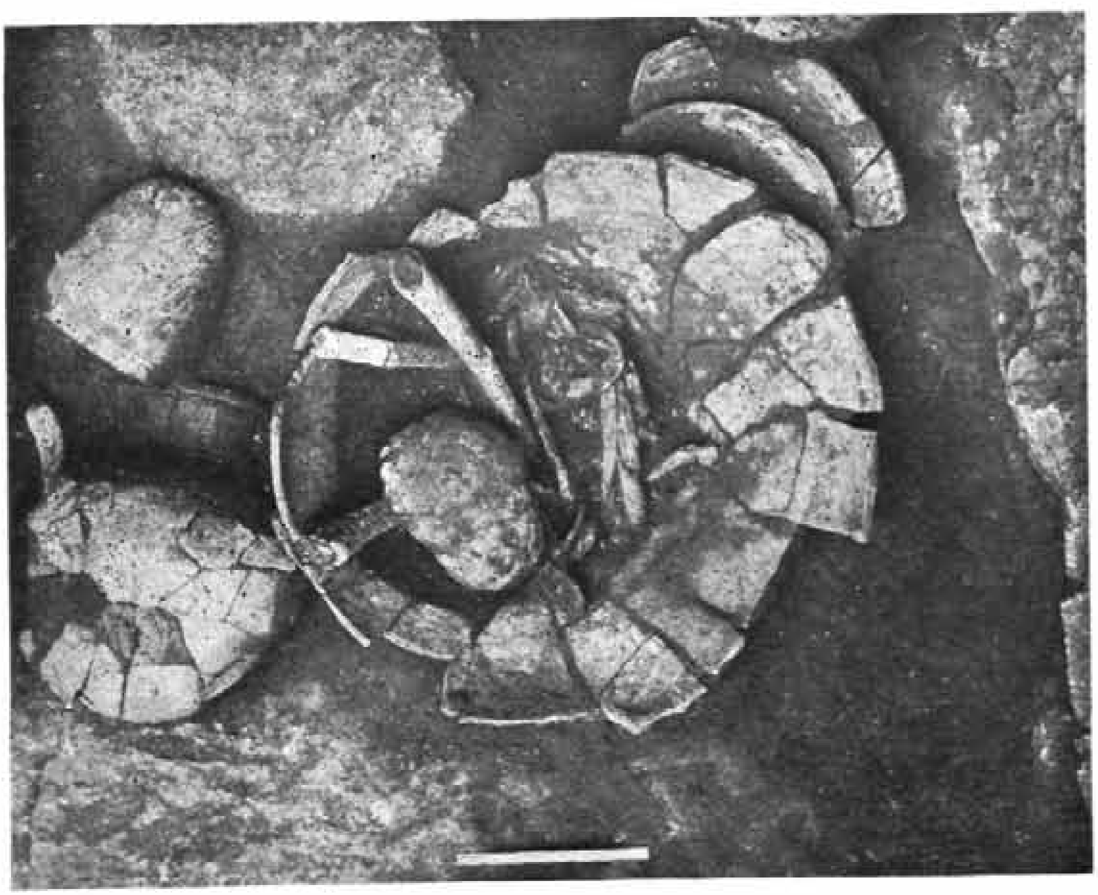


B

Tadakanahalli : A, *skeletal remains from Megalith I*; B, *vases from Megalith II*. *See p. 46*



A

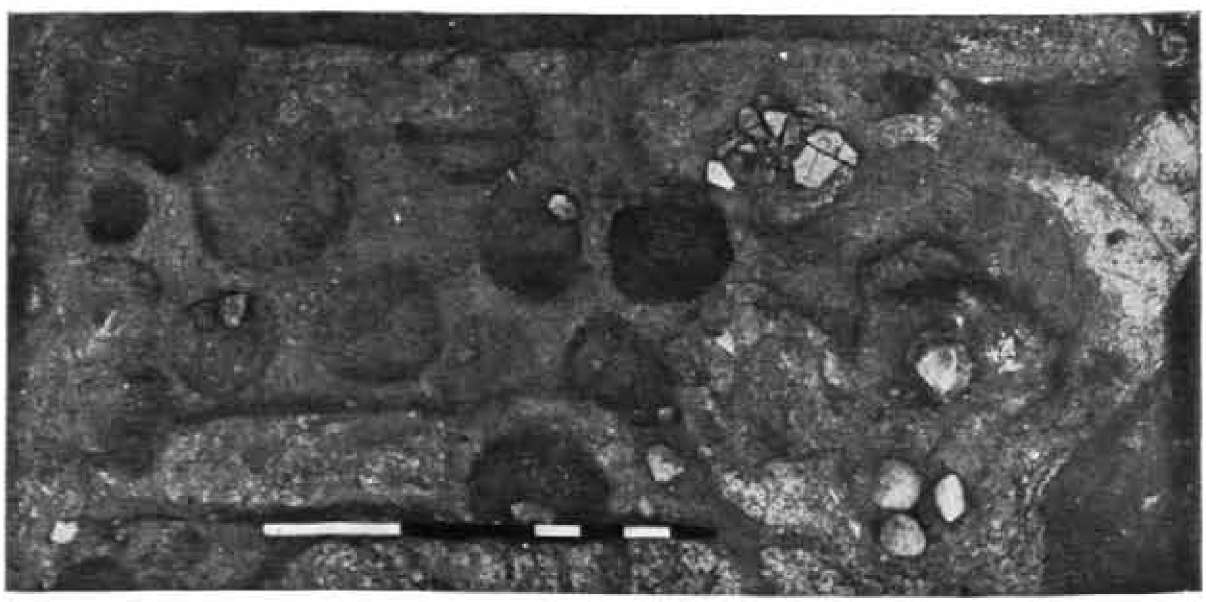


B

Tadakanahalli : A, *Megalith III*; B, *urn-burial*. *See p. 46*

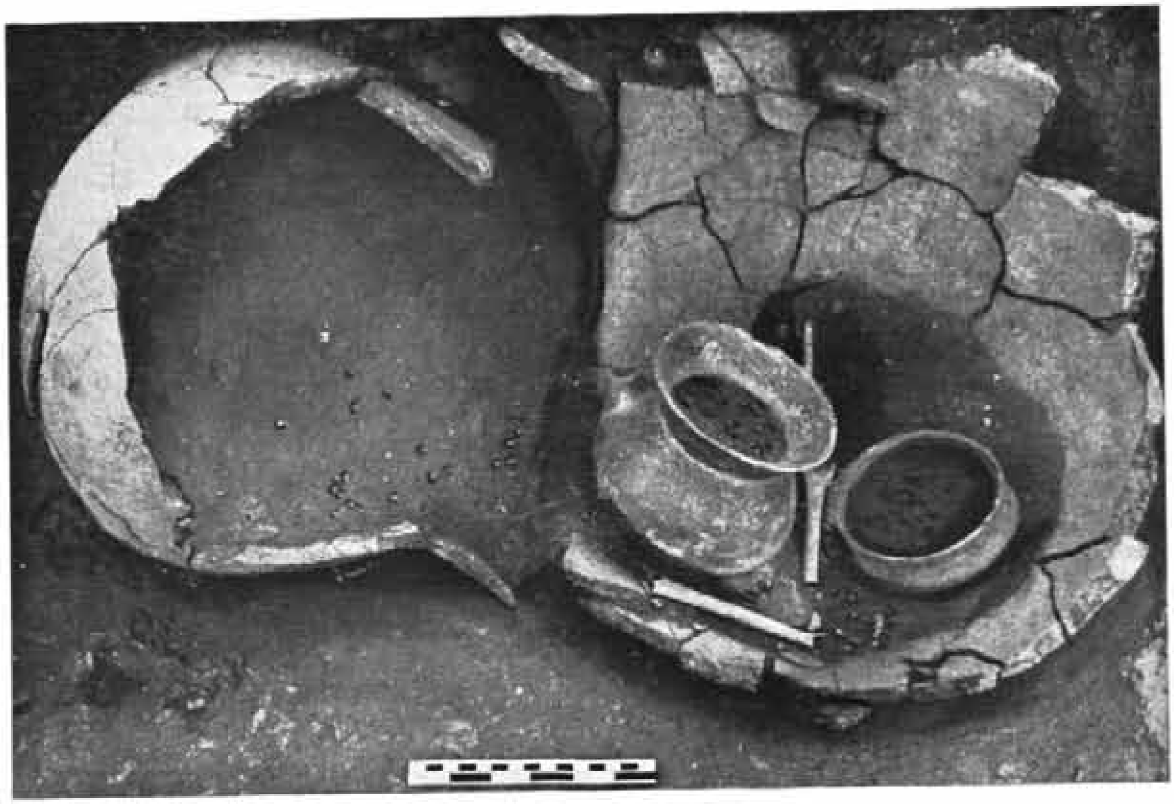


A

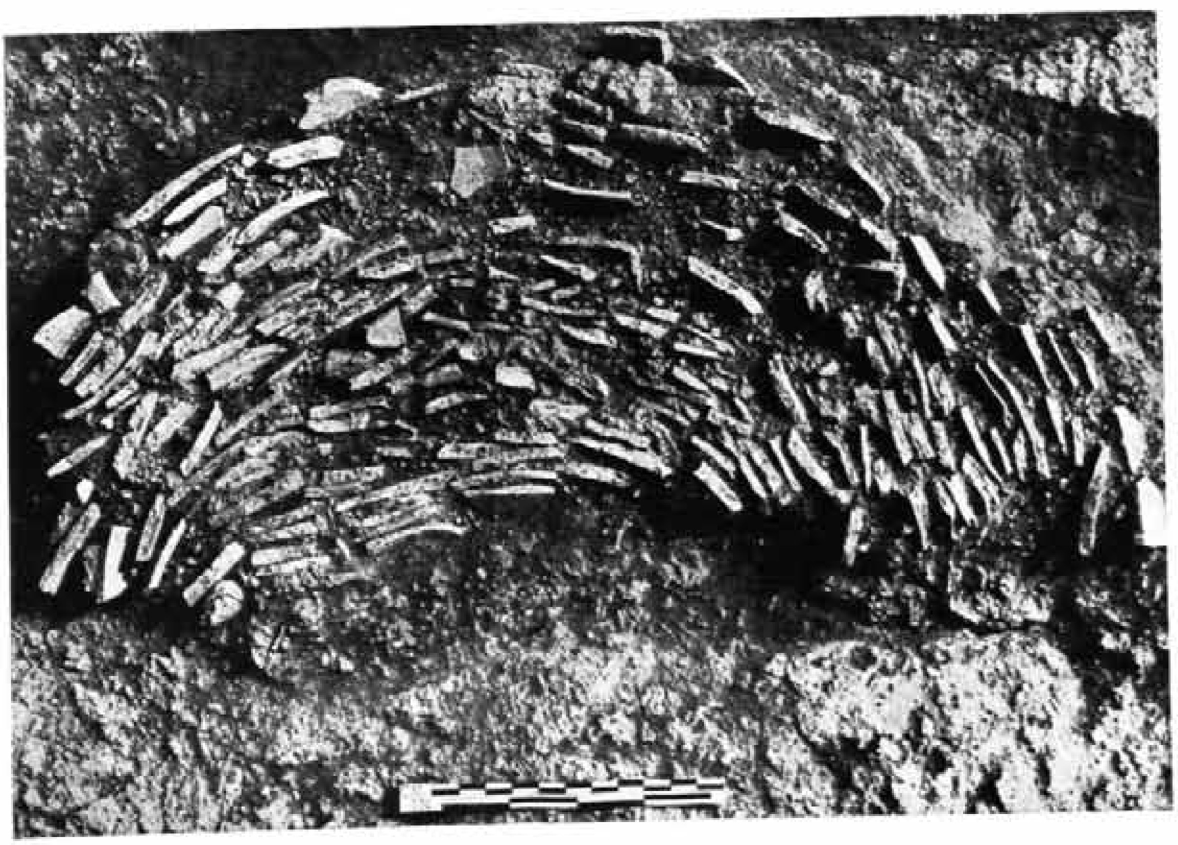


B

Daimabad : A, *exposed structural remains*; *and* B, *apsidal structure from Phase IV.* *See p. 47*



A

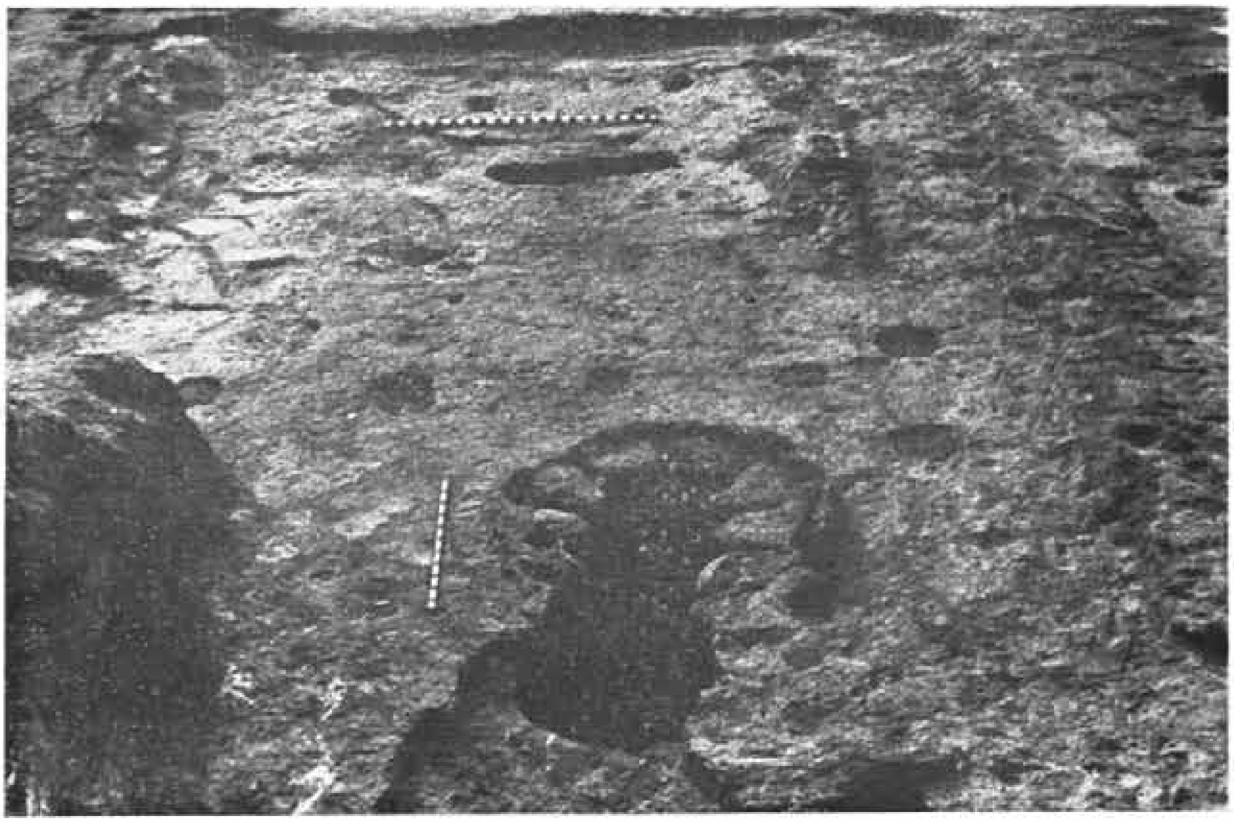


B

Daimabad : A, *double-urn*; B, *floor with Malwa pottery*. *See pp. 47 and 49*



Daimabad : remains of House no. 34 of Phase V. *See p. 50*



A

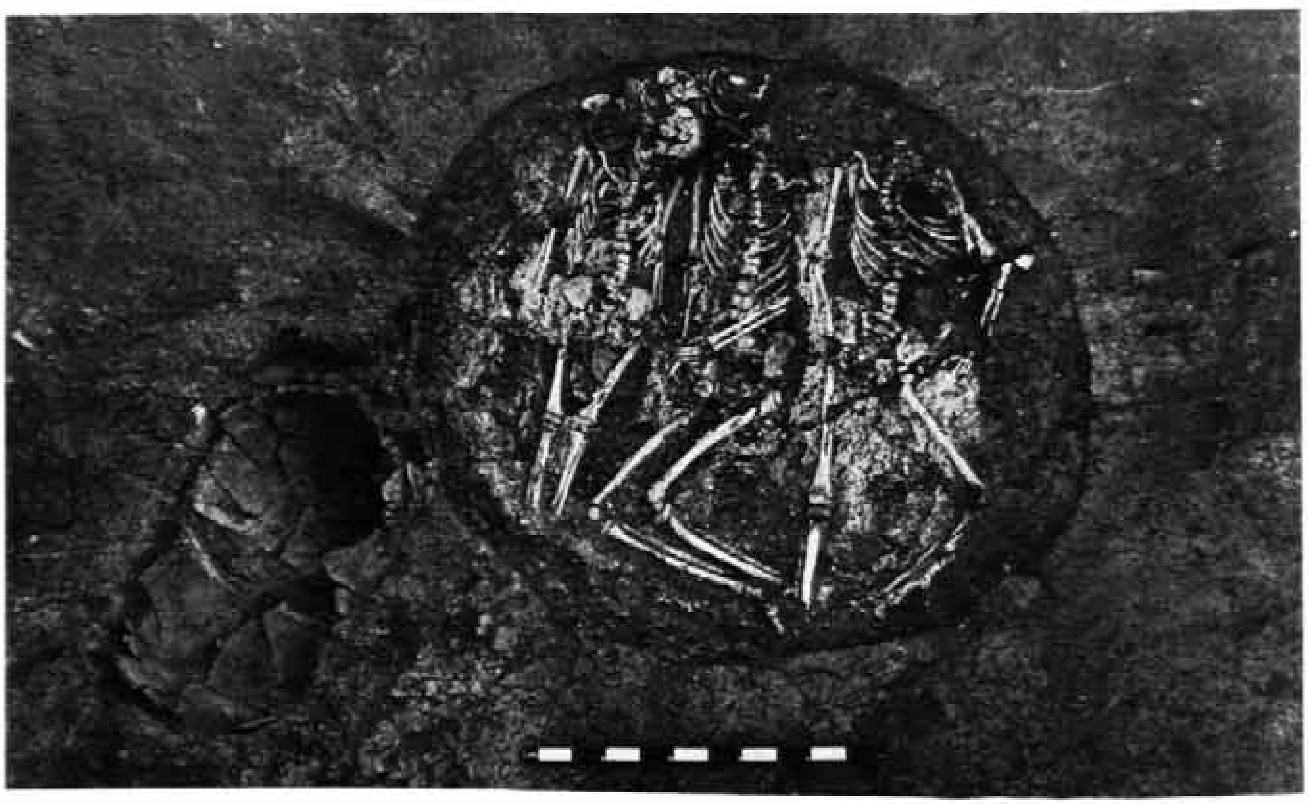


B

Inamgaon : A, *pottery kiln*; B, *fire-chamber of the kiln*. *See p. 53*

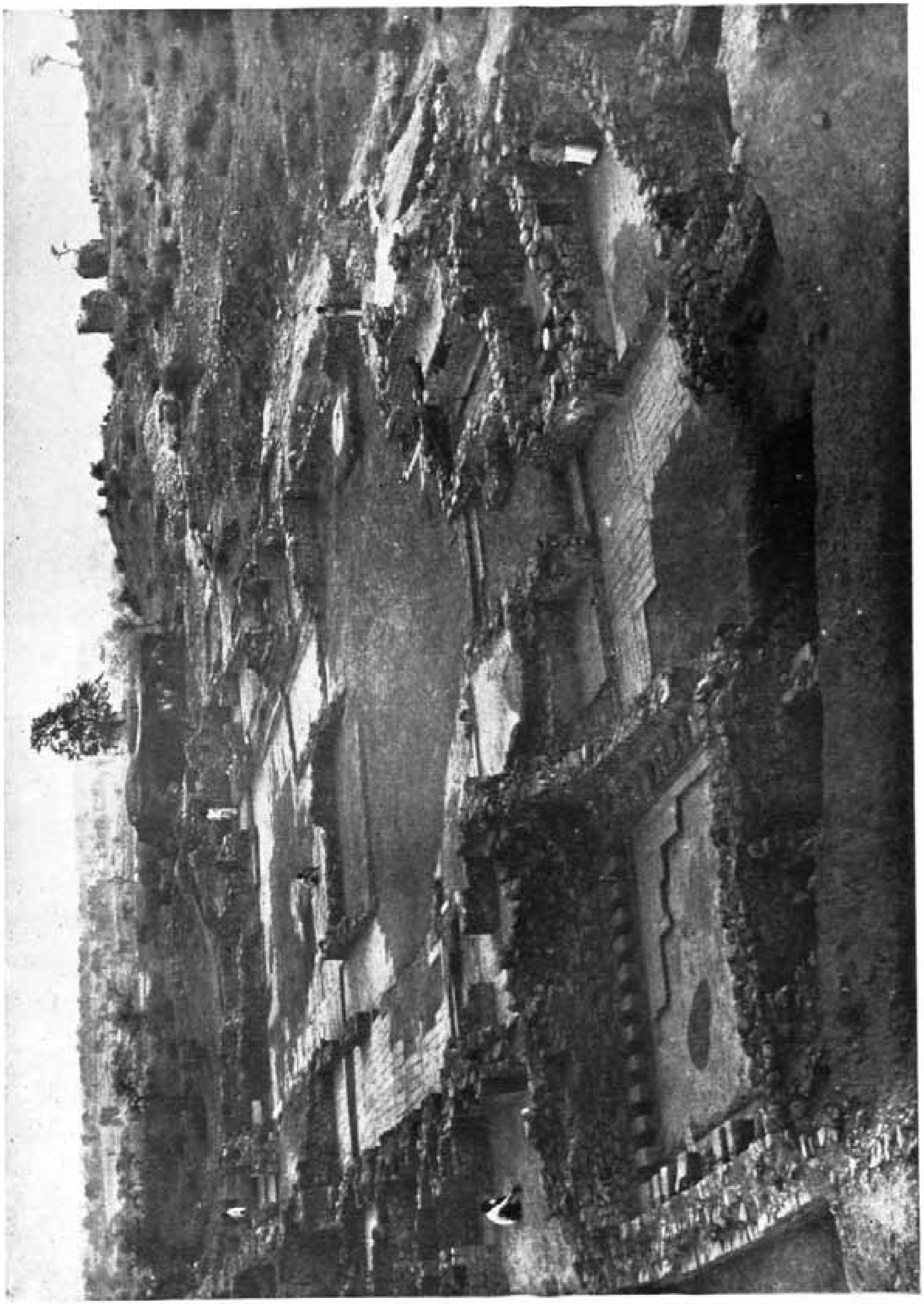


A



B

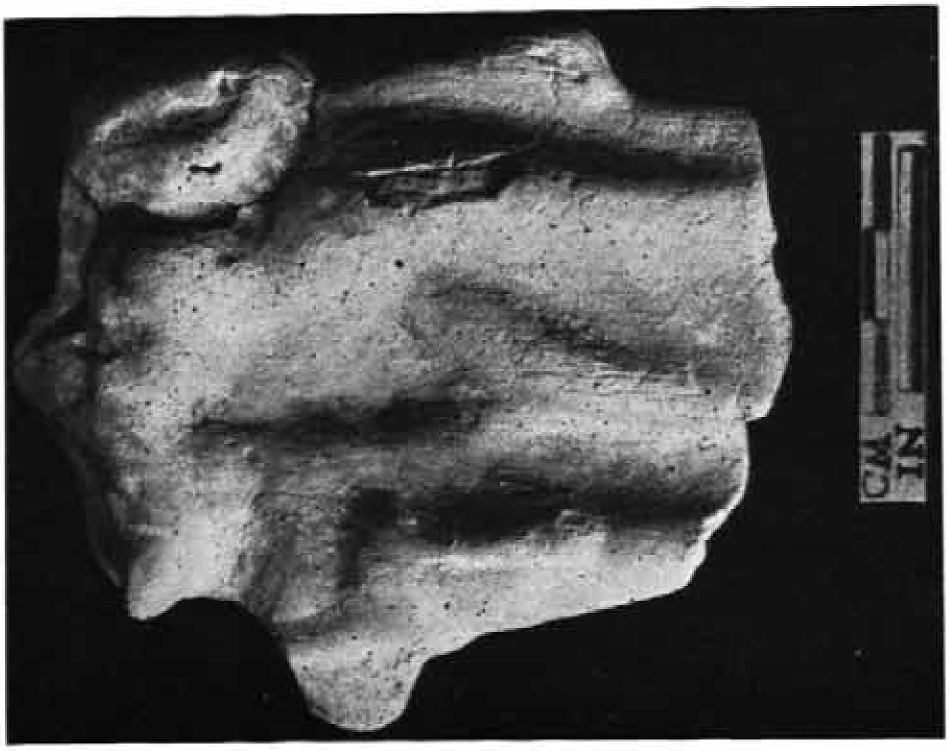
Inamgaon : A, *pottery from overlap phase*; B, *skeletons of children in a pit.* *See p. 53*



Fatehpur Sikri : general view of exposed structures. *See p. 55*

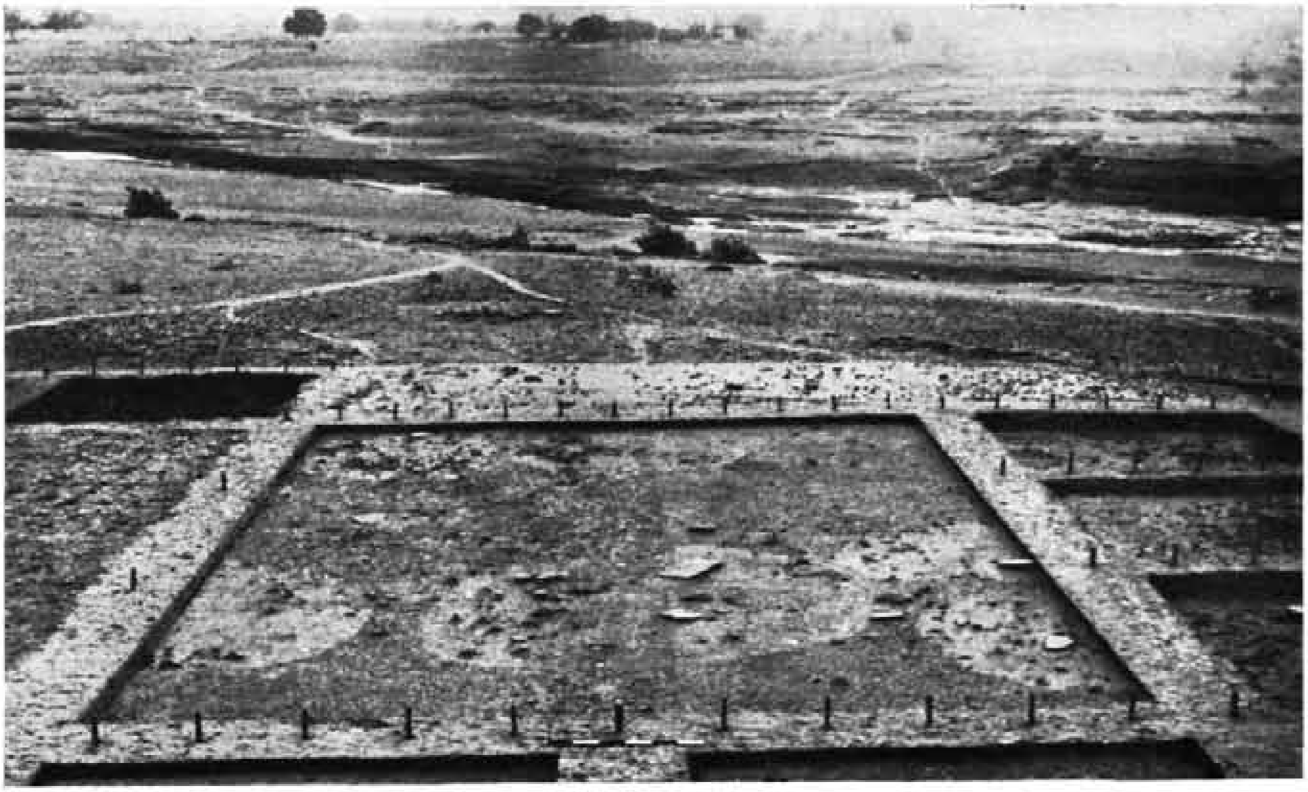


A

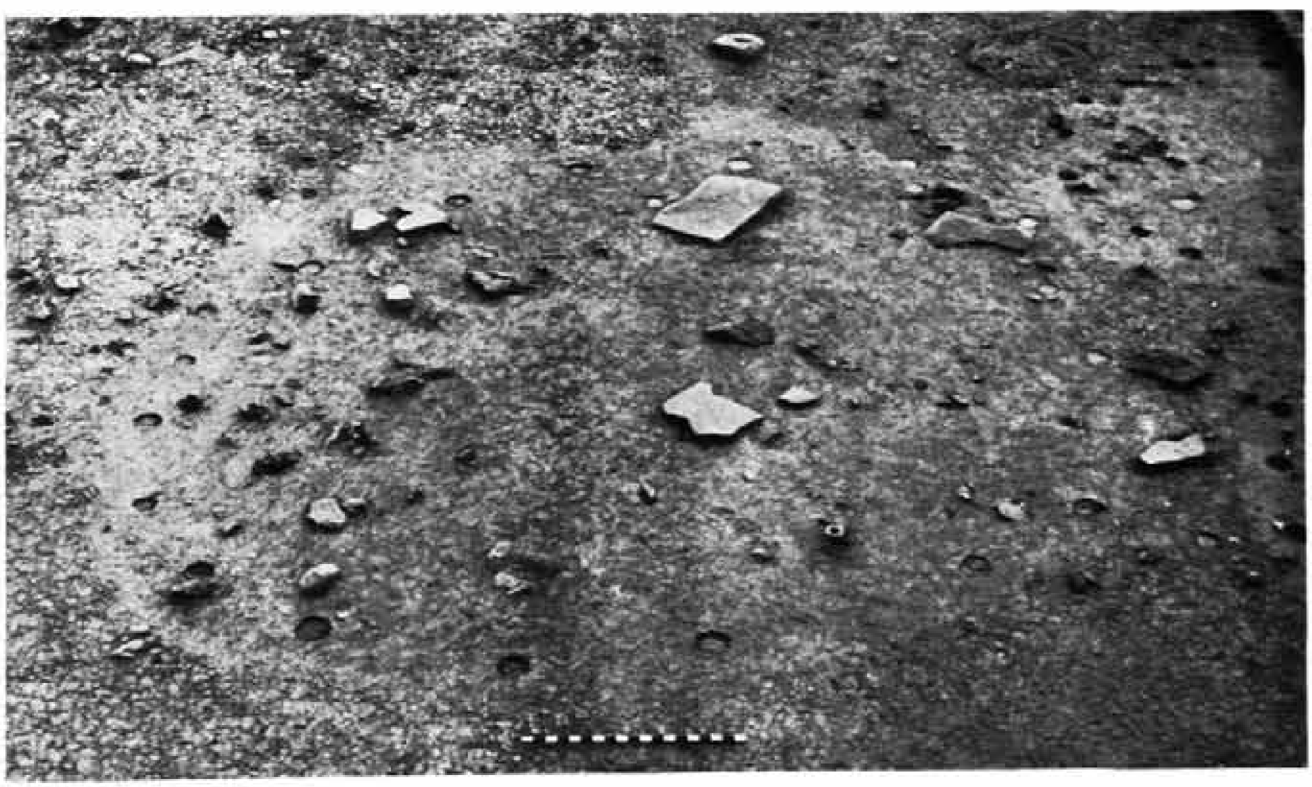


B

Bhardwaj Ashram : Gupta terracotta figurines. *See p. 56*



A

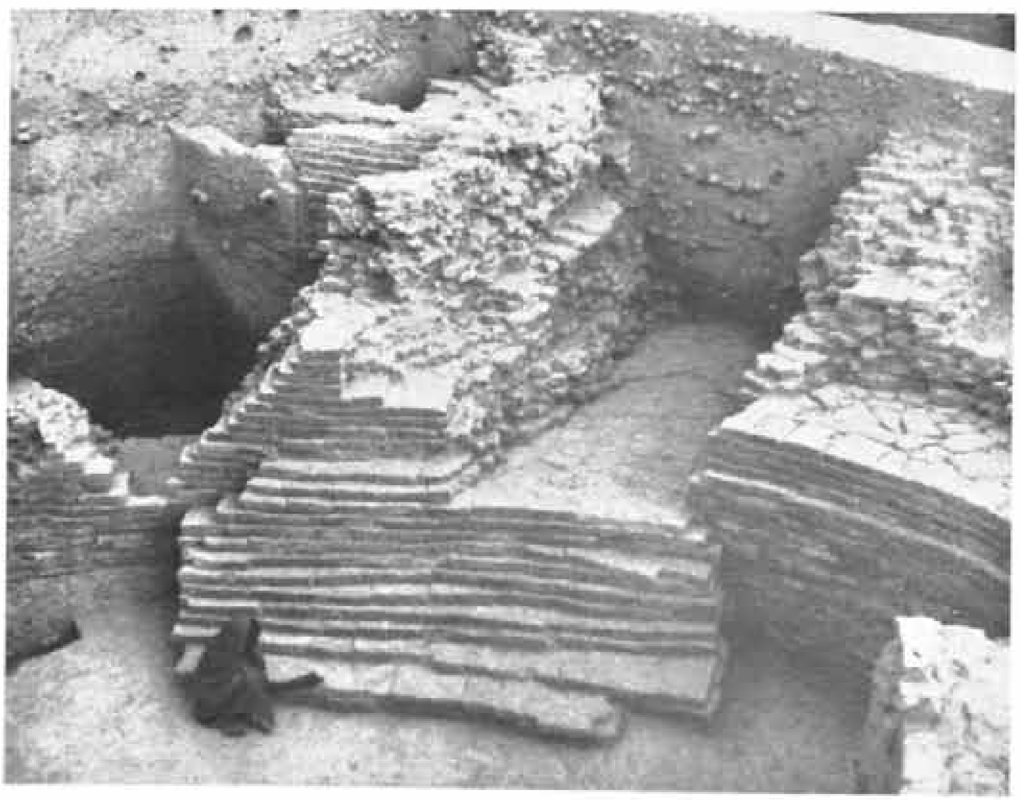


B

Chopani-Mando : A, *circular or oval huts*; B, *floor level strewn with stone tools and pottery.* *See p. 56*



A

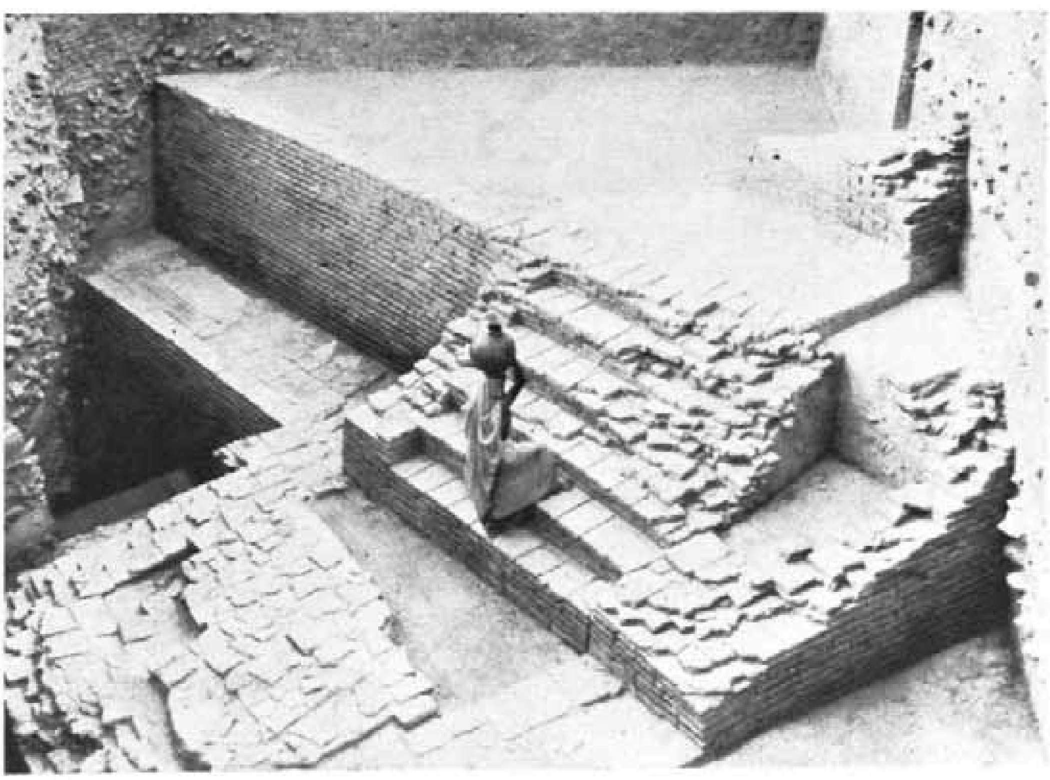


B

Sringaverpur : A, *channel*; B, *inlet reservoir*. *See p. 58*



A

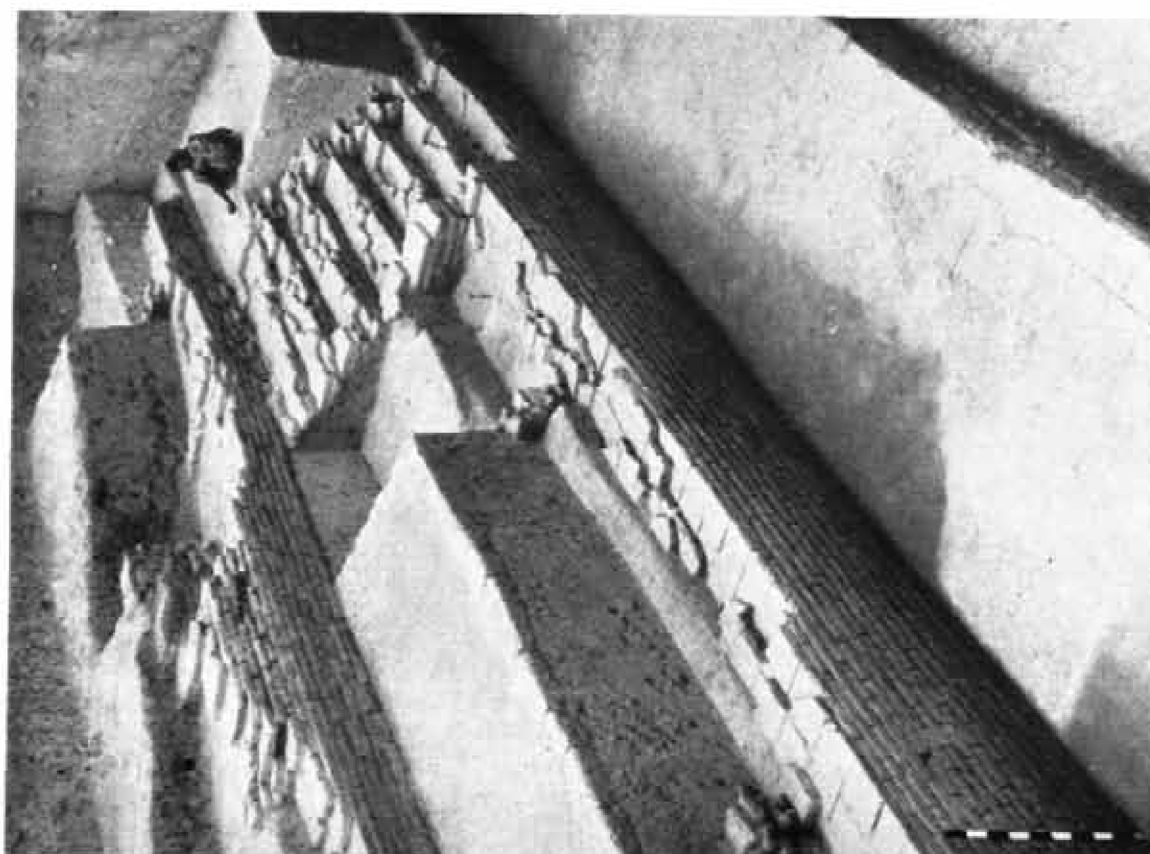


B

Sringaverpur : A, *part of exposed tank*; B, *staircase*. *See p. 58*



B



A

Sringaverpur : A, *steps of inner tank*; B, *covered drain*. *See pp.* 58-59


A


C


B


D

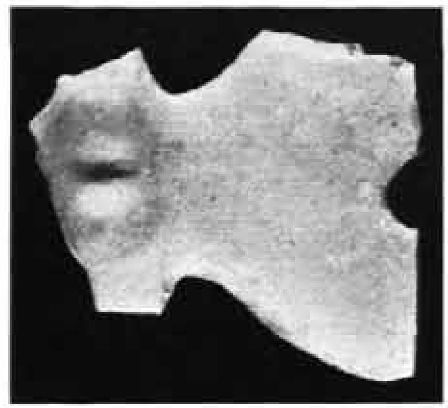
Sringaverpur : terracotta figurines. *See p. 59*



B



D



C



A

Sringaverpur : terracotta figurines. See p. 59



A

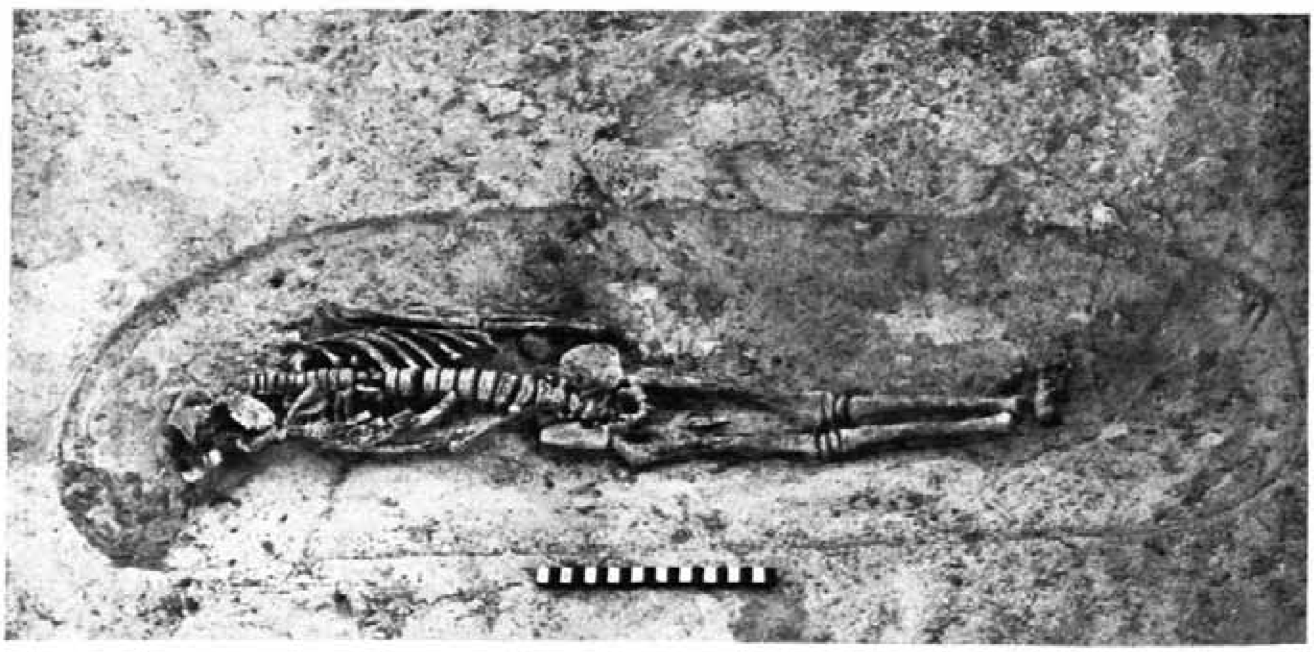


B

Mahadaha : A, *cemetery*; B, *hearth*. *See pp. 59-60*



A

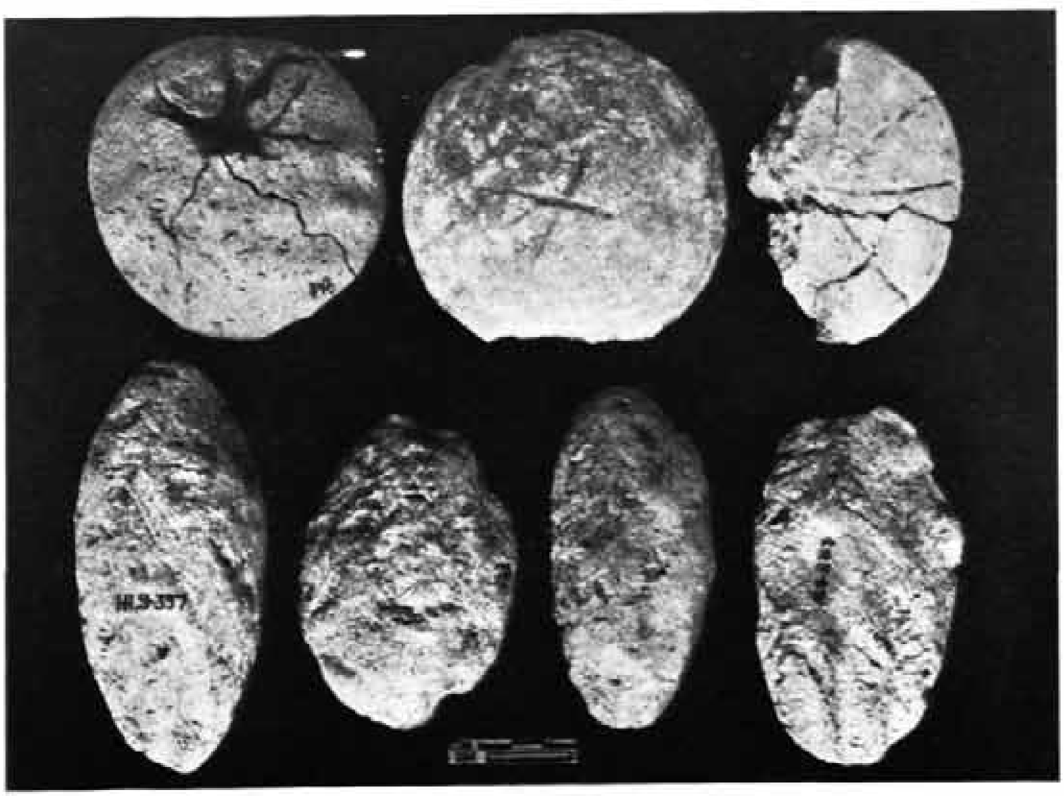


B

Mahadaha : A, *burial with folded legs and hands on pelvis*; B, *child burial*. *See p. 59*



A



B

Hulas : A, *Harappan pottery*; *and* B, *terracotta cakes.* *See p. 60*

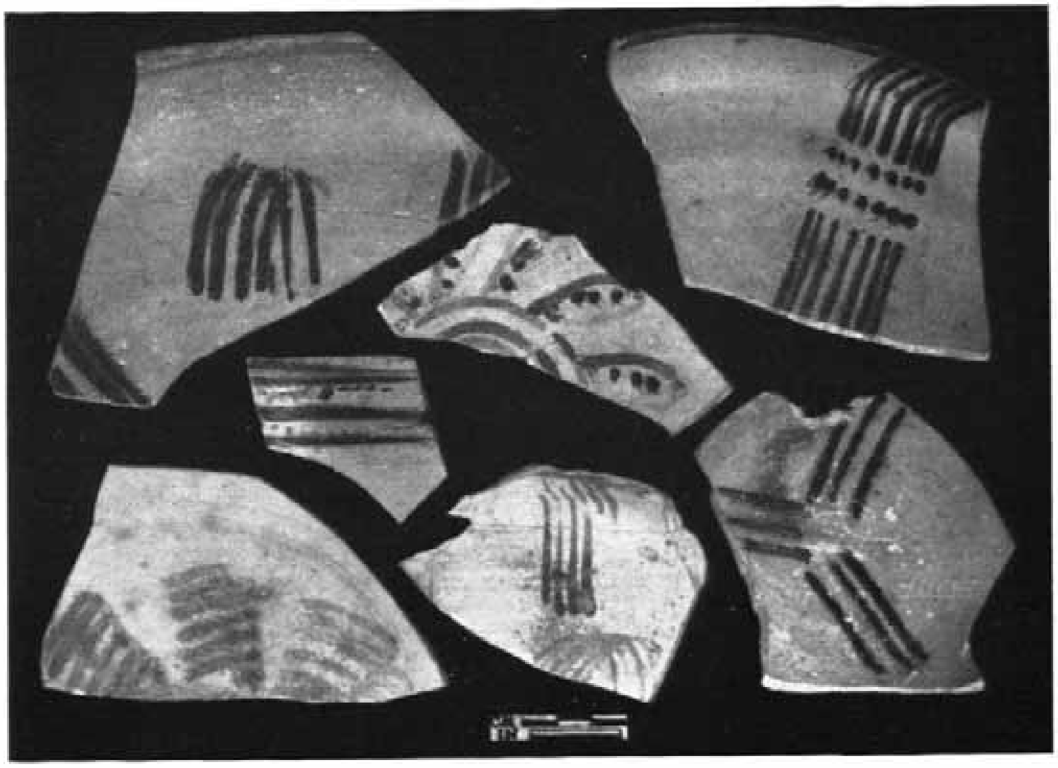


A

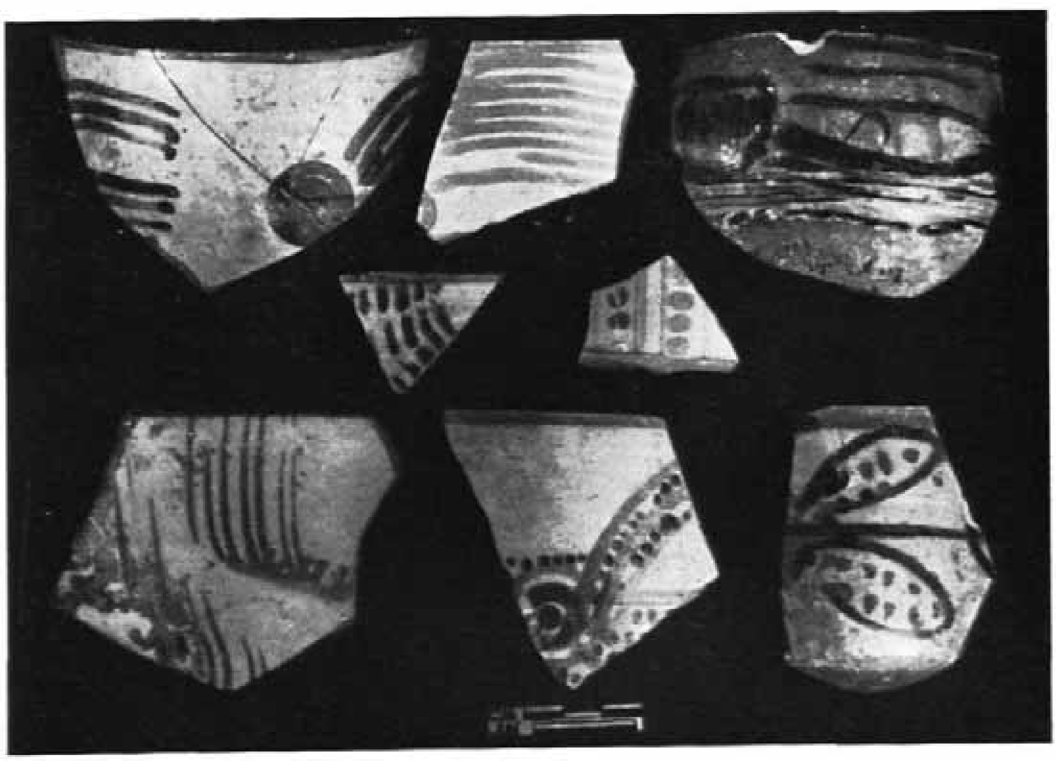


B

Hulas : A, oval-shaped hearth of Period I; B, moulded pottery, Period V. See pp. 60-61



A



B

Hulas : Painted Grey Ware sherds, Period II. *See p. 60*

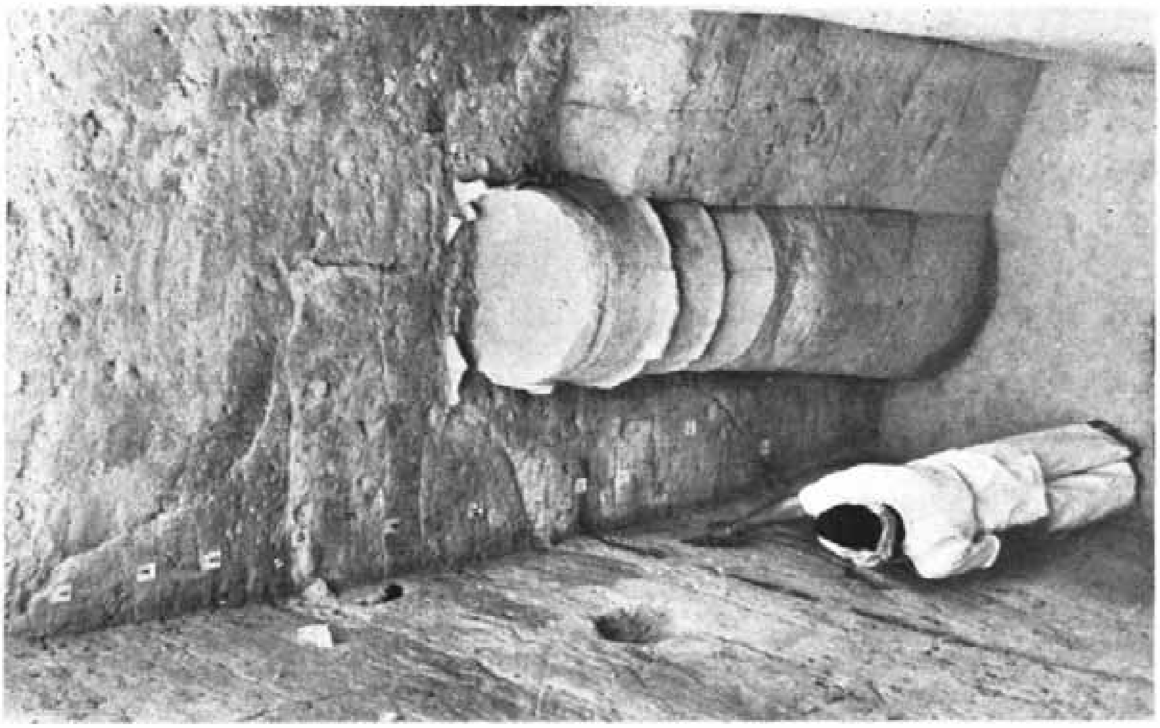


A



B

Hulas : A, *double storage jar*; B, *brick structure* (*Period IV*). *See p. 61*





A B

Pariar : A, *Trench PRR-3*; B, *terracotta ring-well. See pp. 61-62*



A



B

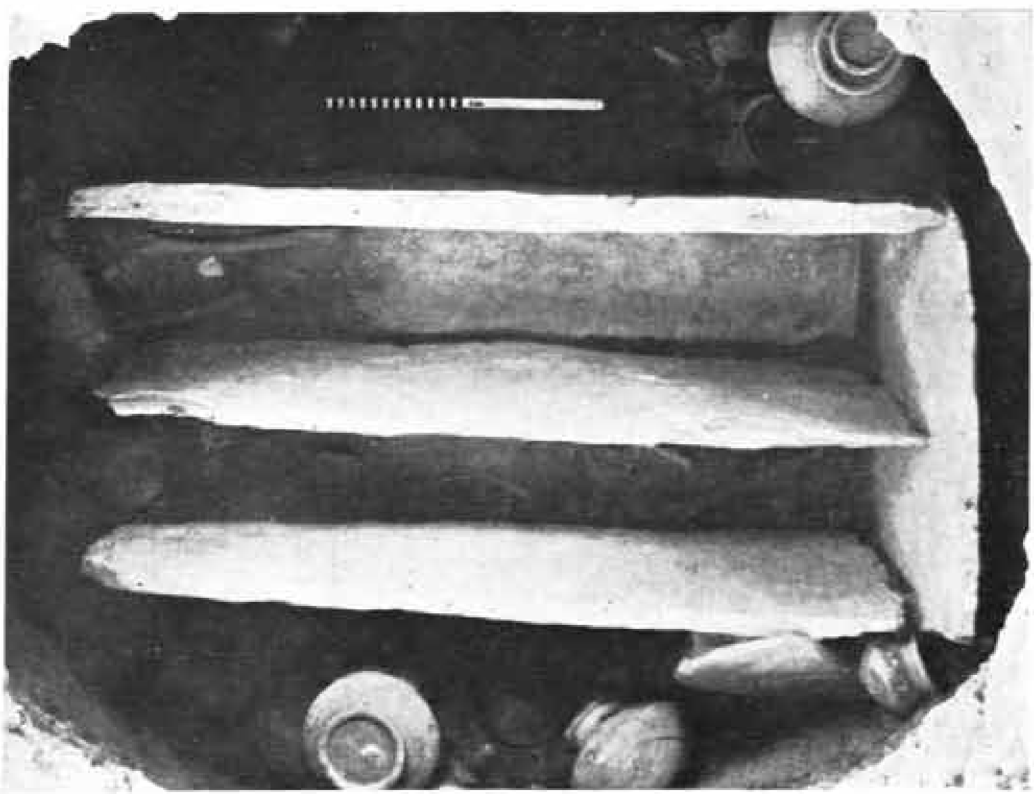


C

Keesaragutta: A, *excavated structures*; B, *plaque depicting mother goddess*; C, *ornamental pot.* *See pp.* 63-64

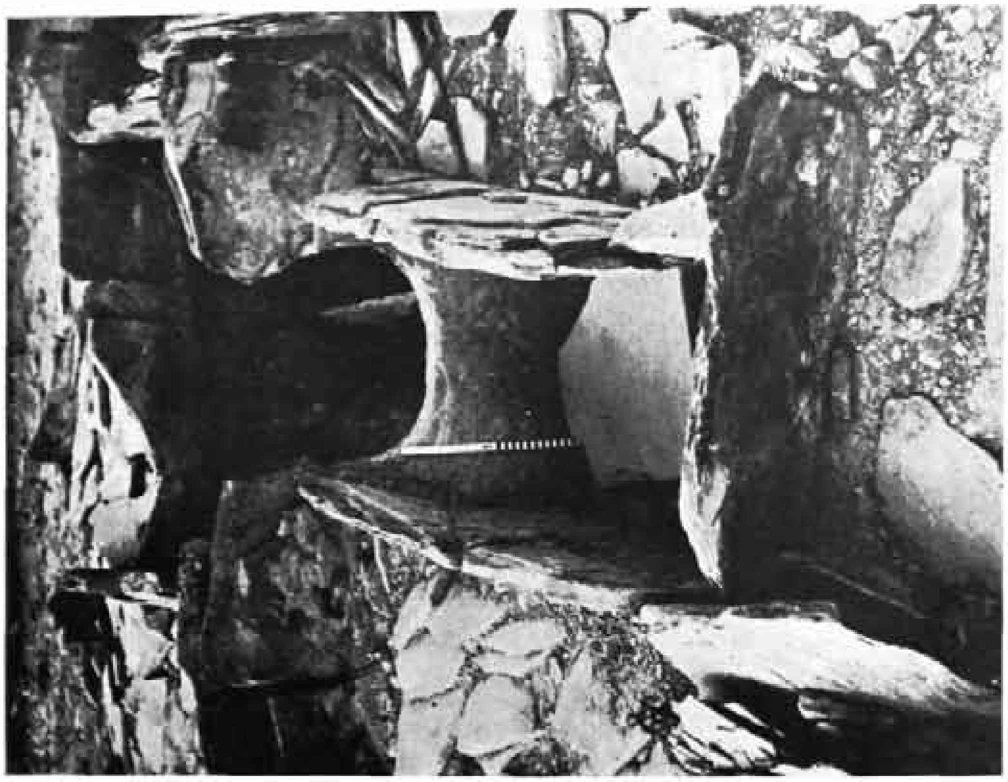


A



B

Uppalapadu : A, pit-burial; B, cist-burial. See pp. 63-66





A B

Uppalapadu : A, three cists in pit, B, cist without interments. See pp. 65 and 66

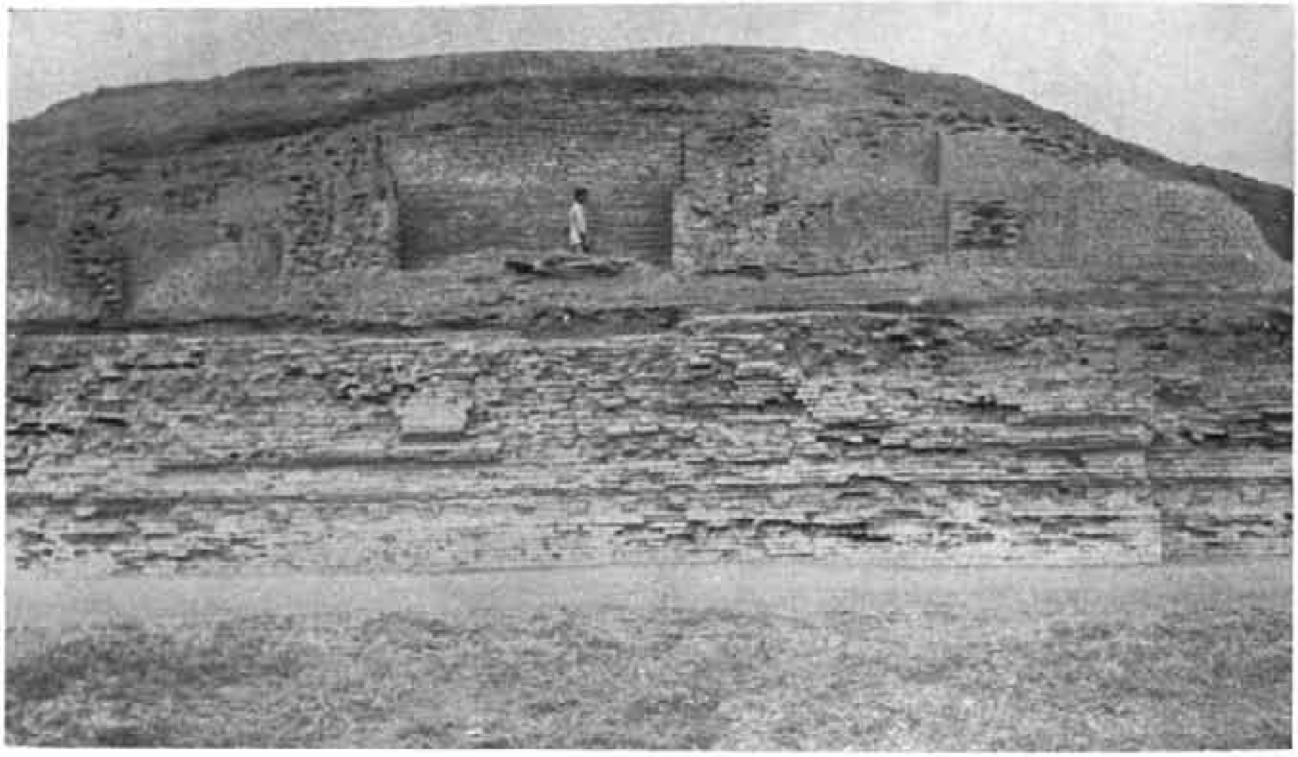


A

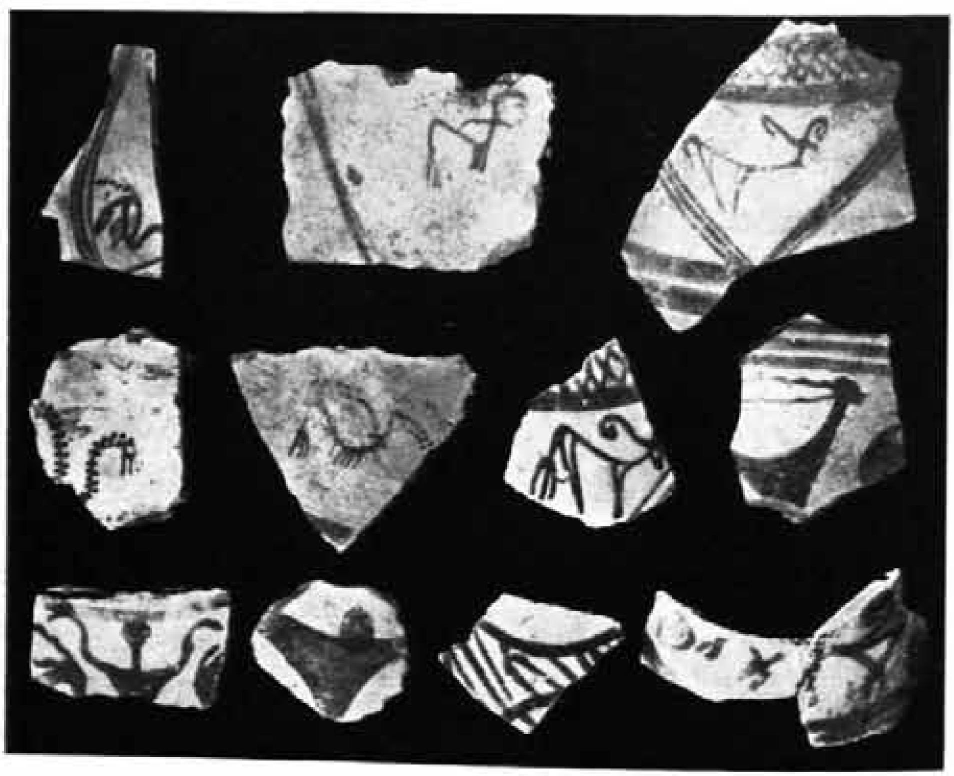


B

Calingapatnam : A, *partially-exposed stupa of wheel pattern*; B, *its pradakshina-patha*. *See p. 66*

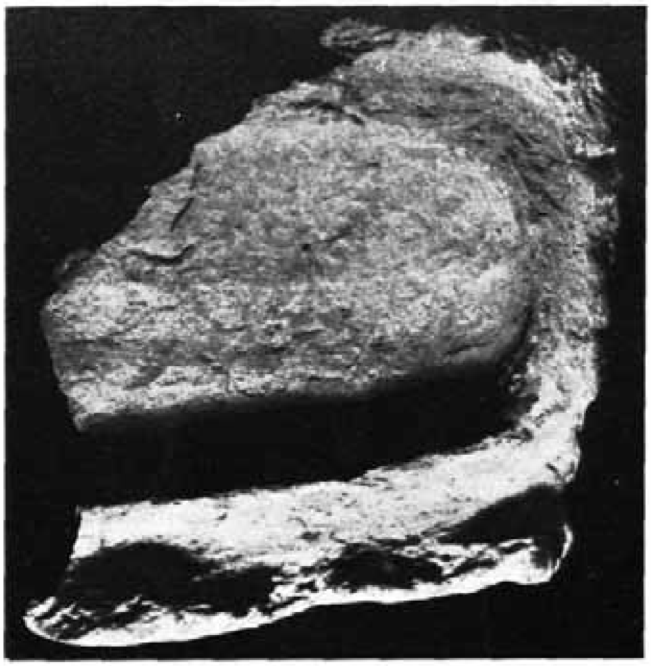


A



B

A, *Aphsad* : *excavated temple*; B, *Dangwada* : *chalcolithic pottery, Period I*. *See pp. 67 and 70*



A



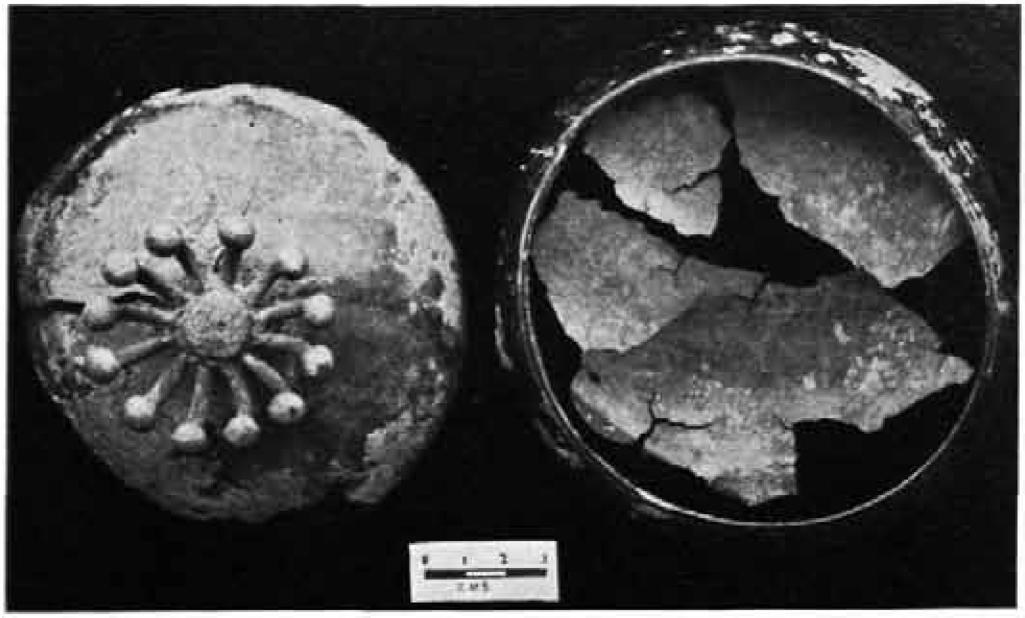
C



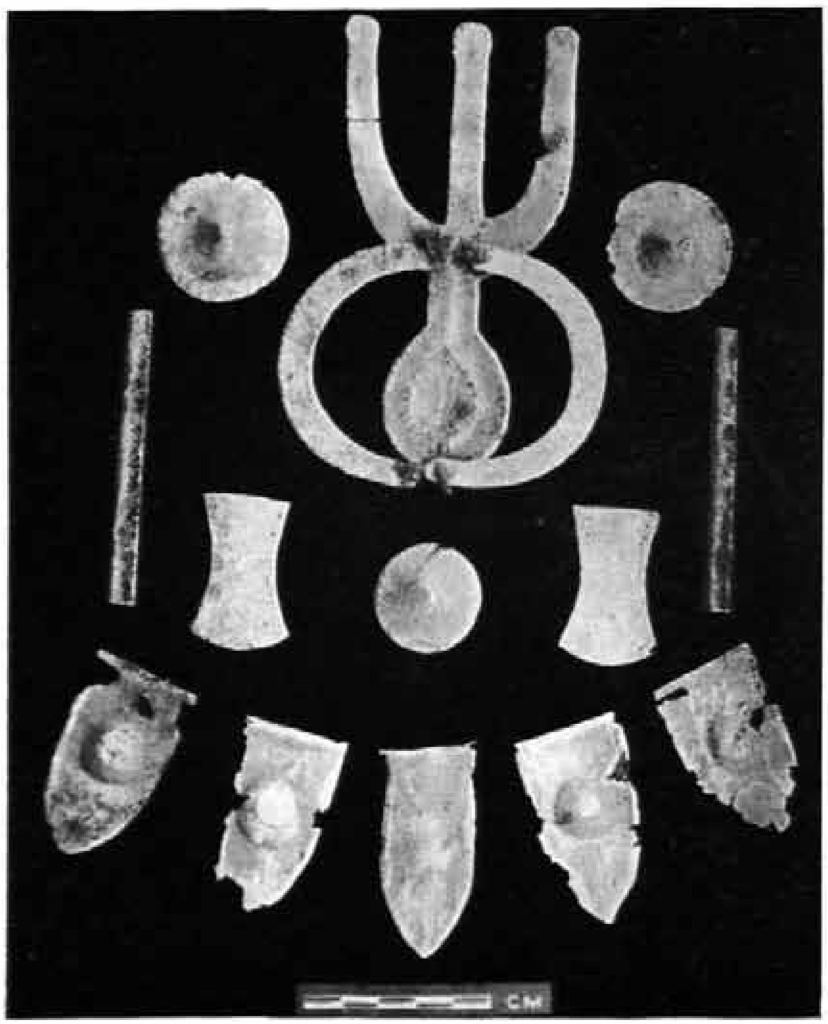
B

Dangwada : A, *terracotta mould*; B, *terracotta yaksha*; C, *pot-stand with incised motif.* *See pp. 70-71*

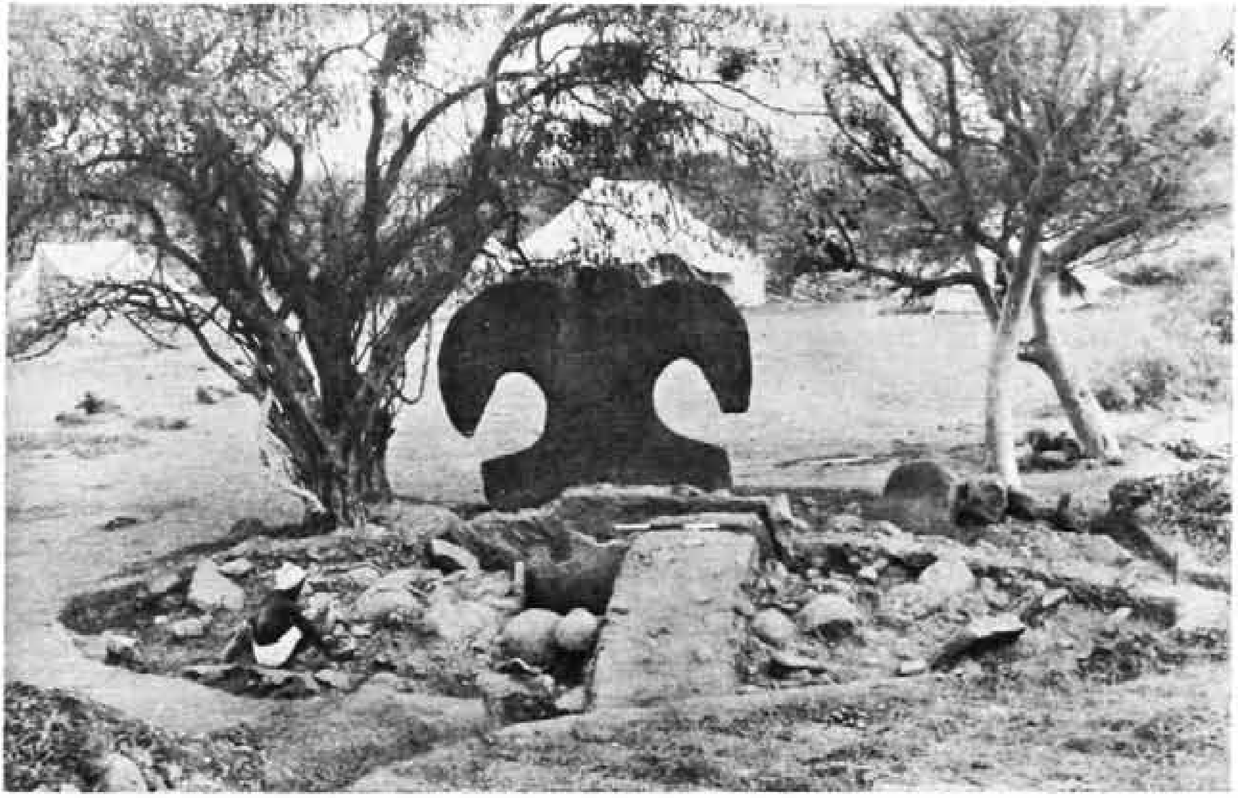
A



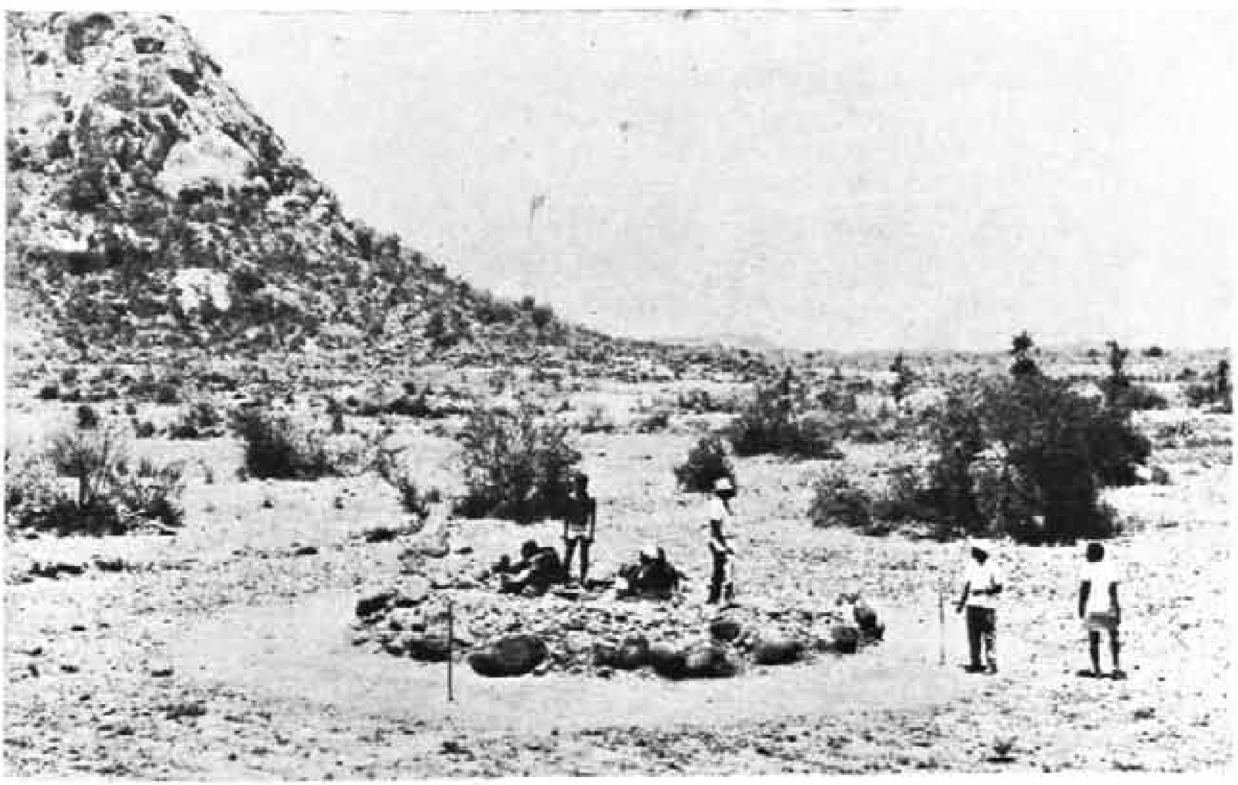
B



Muhurzari : A, *copper lid*; B, *ornaments for horse*. *See p. 71*



A



B

Mottur : A, *exposed cairn circle with anthropomorphic figure*; B, *a view of cairn circle*. *See p. 72*



A

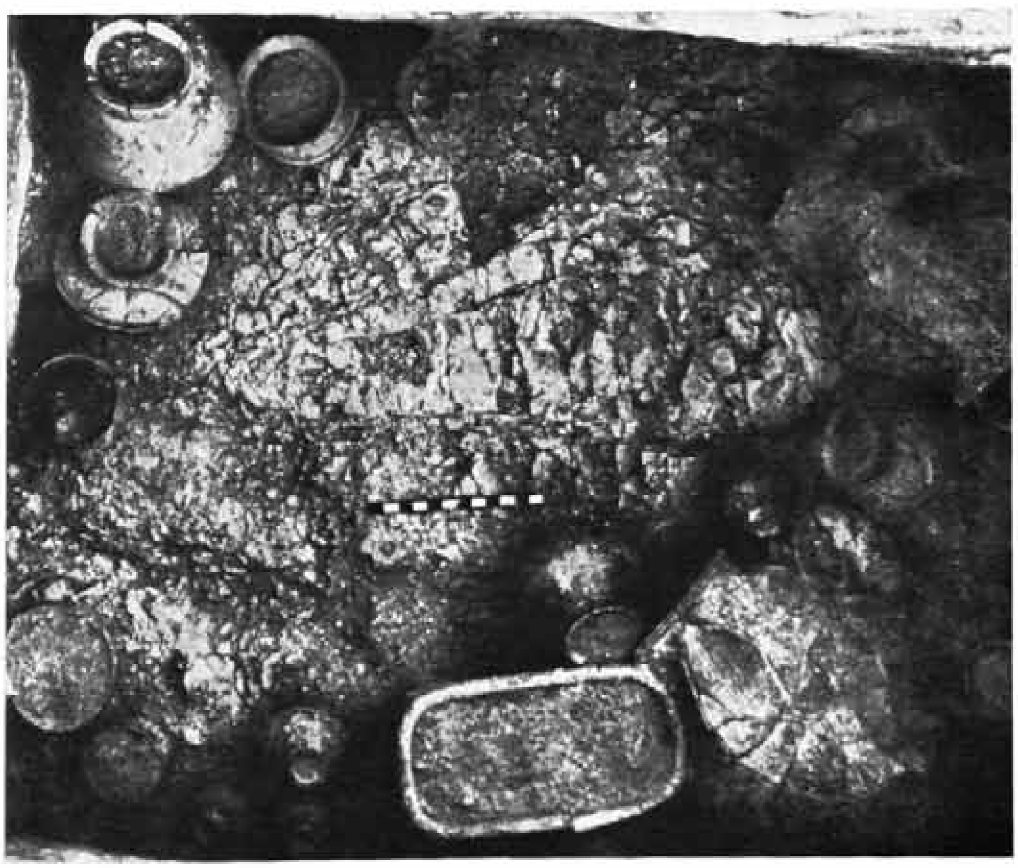


B

Mottur : excavation of megaliths. See p. 72

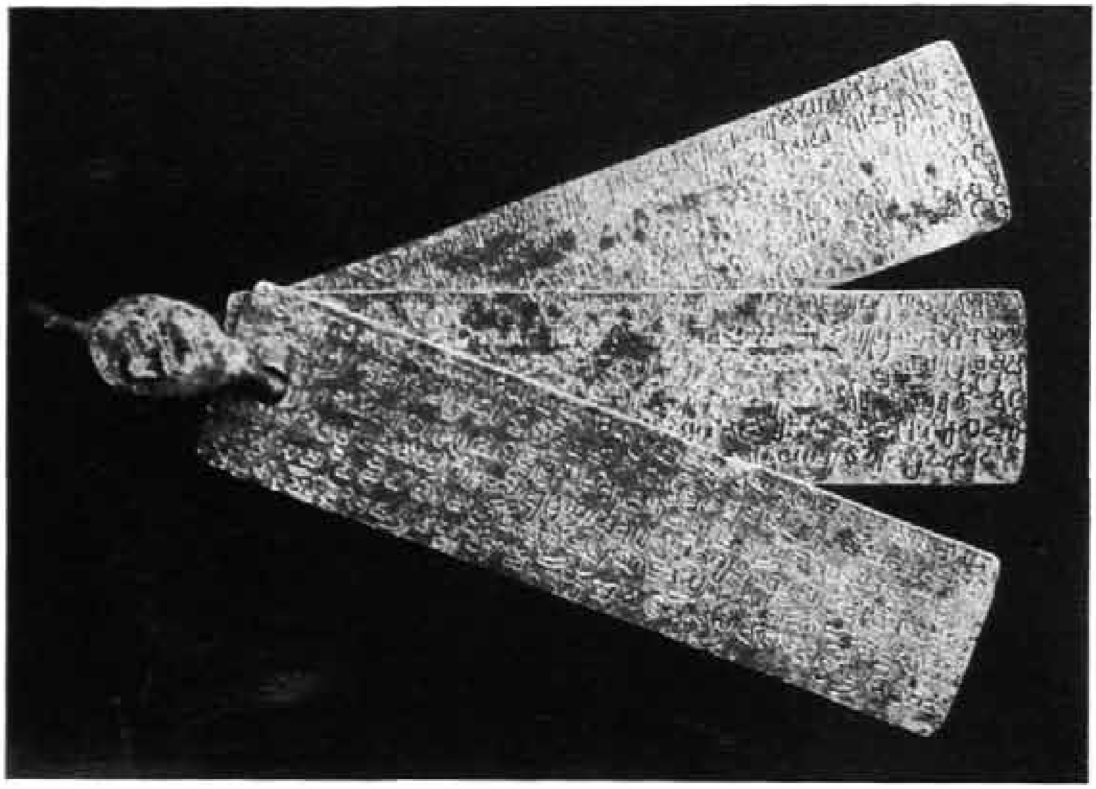


A

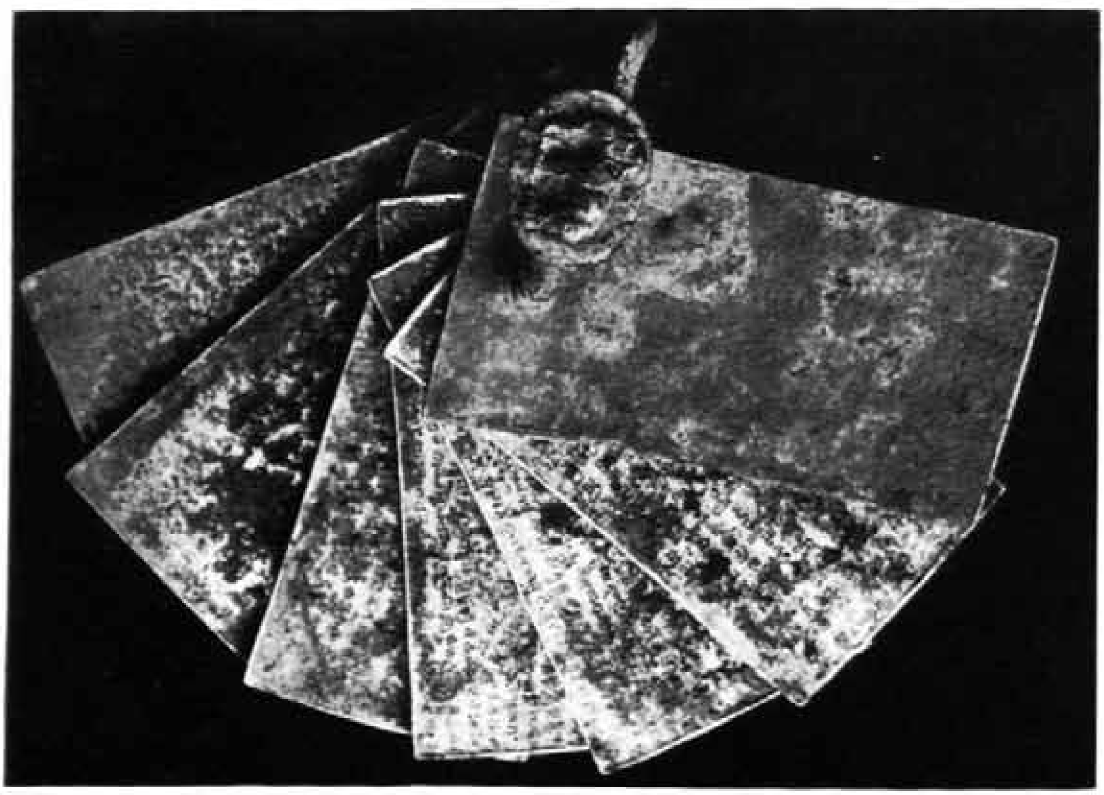


B

Mottur : pottery and sarcophagus in pit. *See p. 72*



A



B

Manne : *copper-plates of Ganga king* : A, *Sri Vikrama*; B, *Narasimha I*. *See p. 79*



A

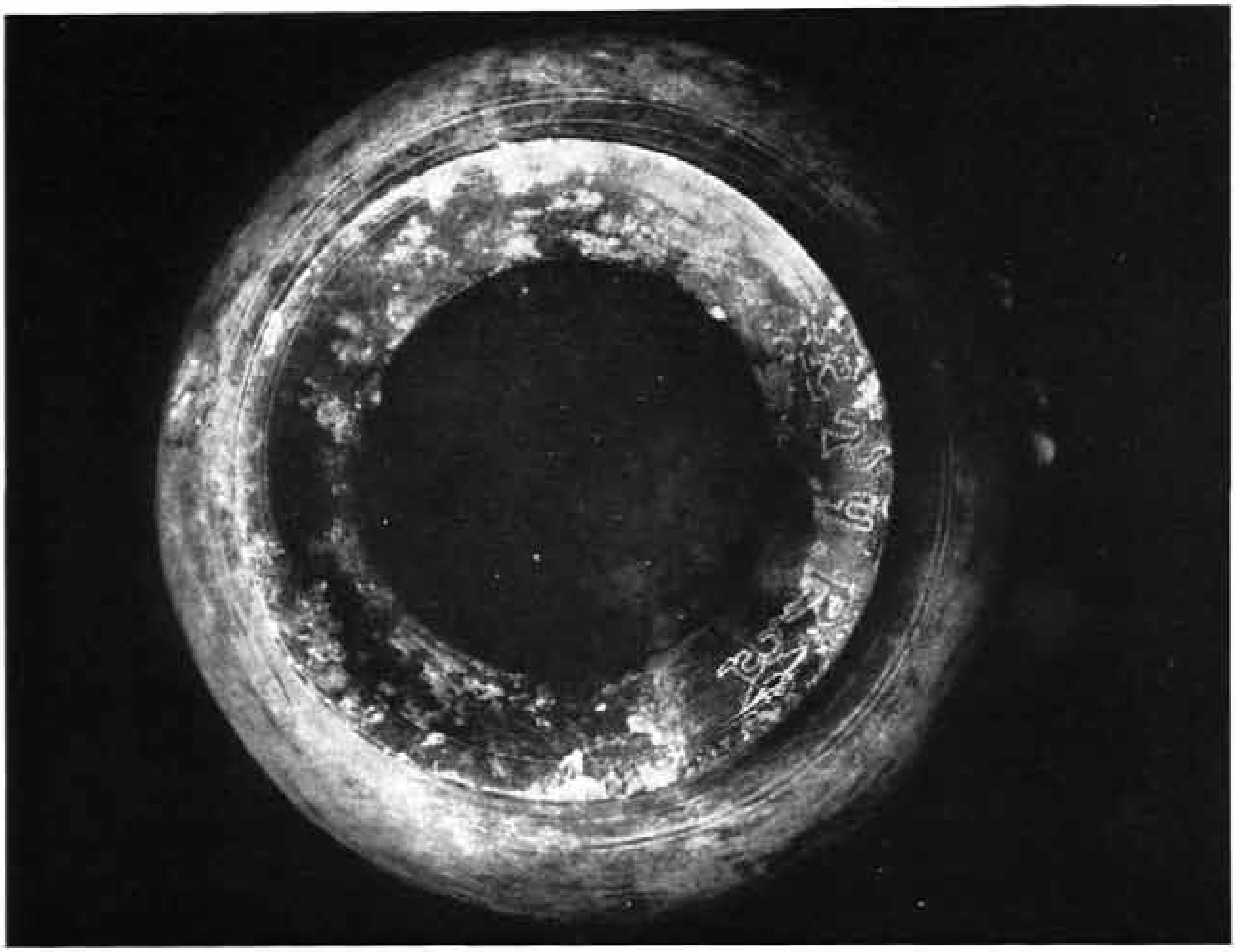


B



C

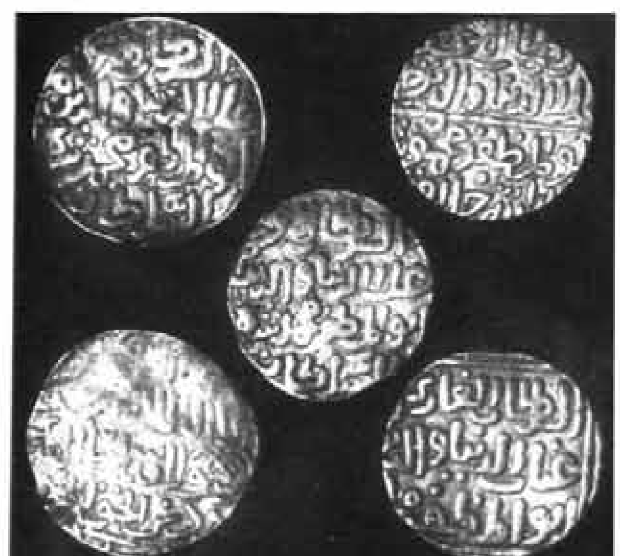
Bari : A-B, *epitaphs of Afghan officials*; C, *inscription of Sikandar Shah Lodi*. *See p. 87*



A

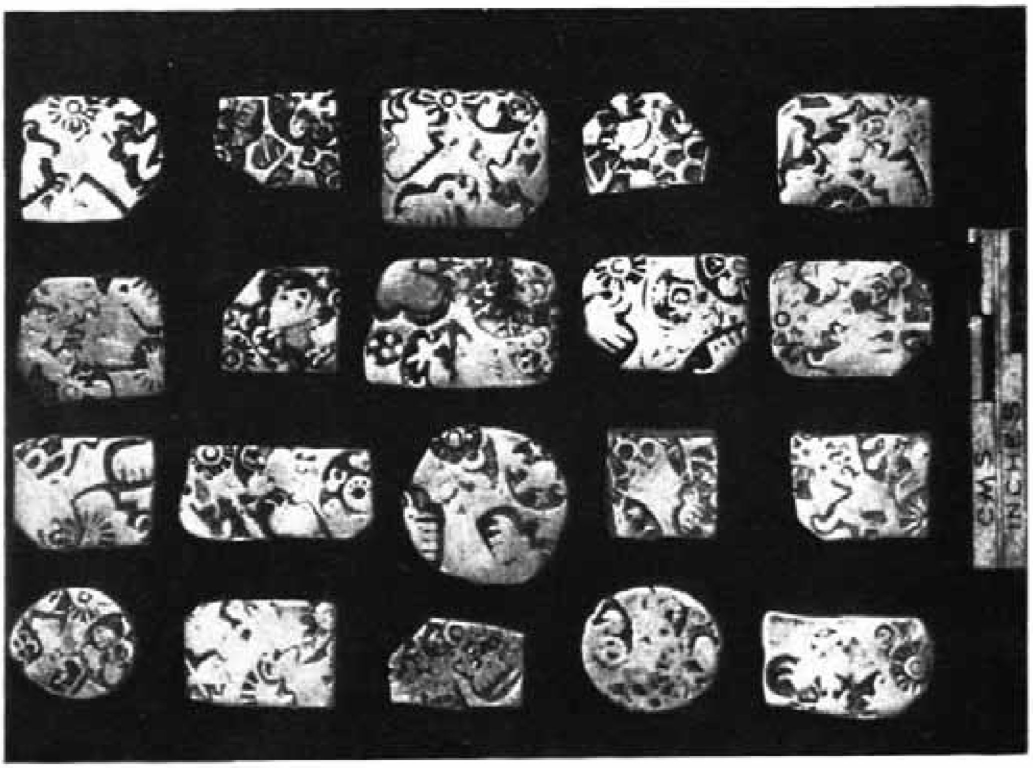


B

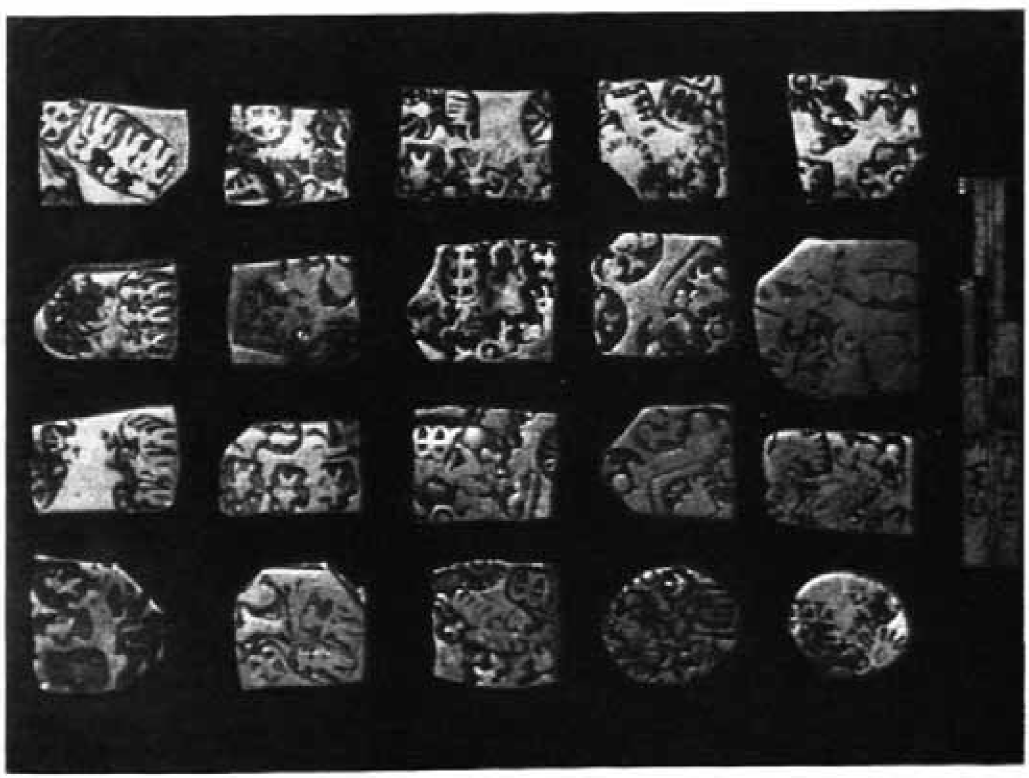


C

A, *Koppal* : *inscribed copper vessel*; B-C, *Chikkhalda* : *gold coins*. *See p. 90*



B



A

Besnagar : silver punch-marked coins. *See p. 90*



B

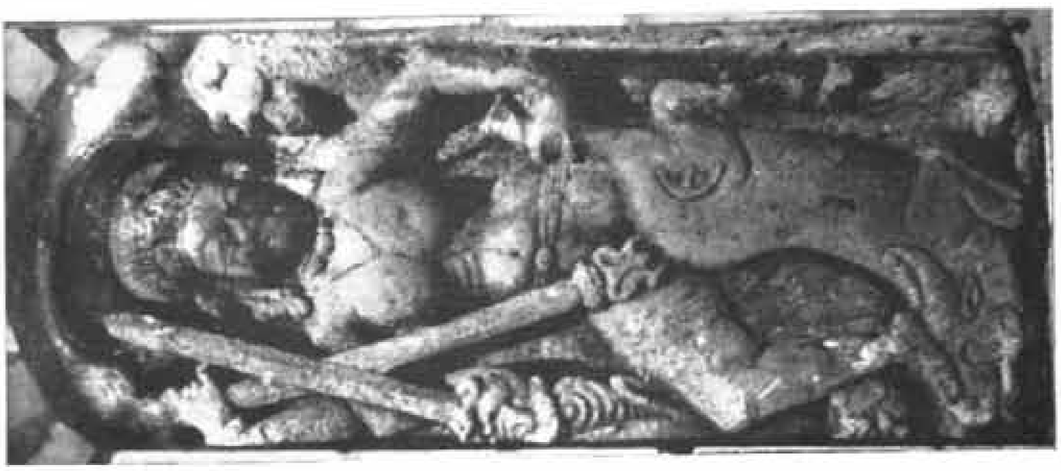


A

Hinglajgarh : A, *Siva* ; B, *Uma-Mahesvara*. *See p.* 98



A



B



C

A, Kalyan : image of Adinatha; B, Kanauj : Mahishamardini; C, Bhuvanpur : Uma-Mahesvara. See pp. 99 and 101



A



B

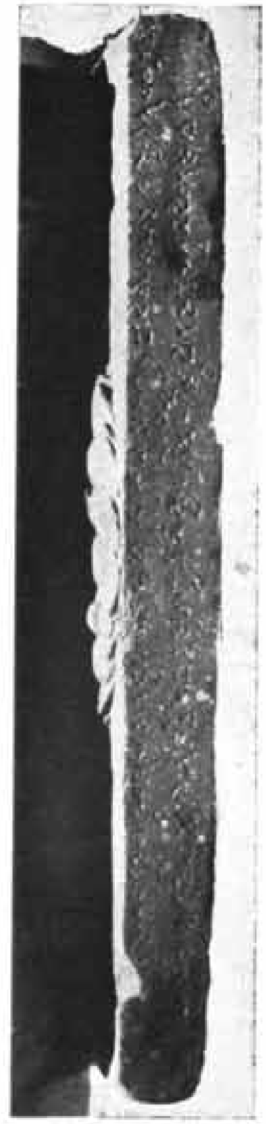


C

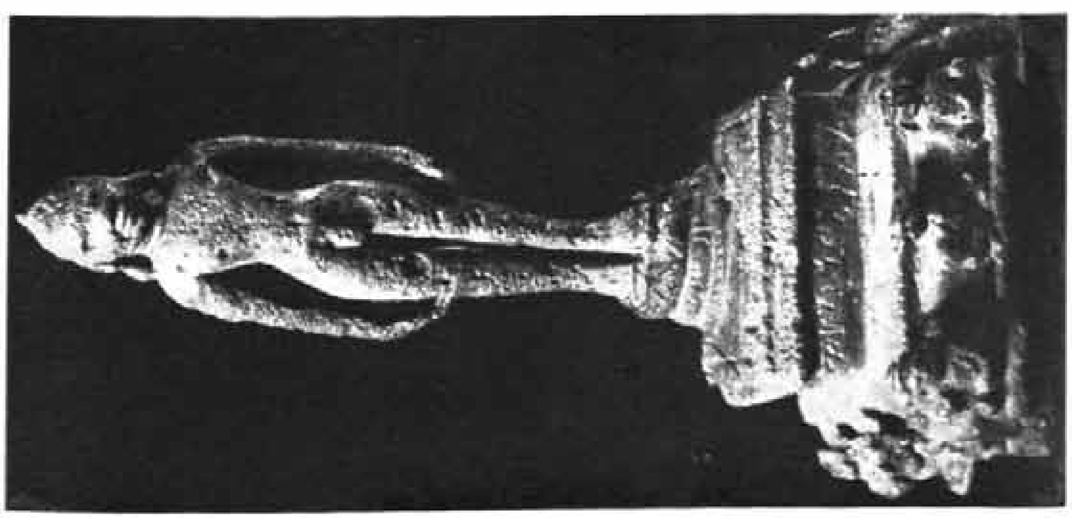
A, *Prince of Wales Museum Bombay : view of the exhibition 'Lure of Art'* : B, *Asutosh Museum of Indian Art, Calcutta : illustrated Napalese manuscript*; C, *Indian Museum, Calcutta : Chhau marks.* *See p. 111*



B

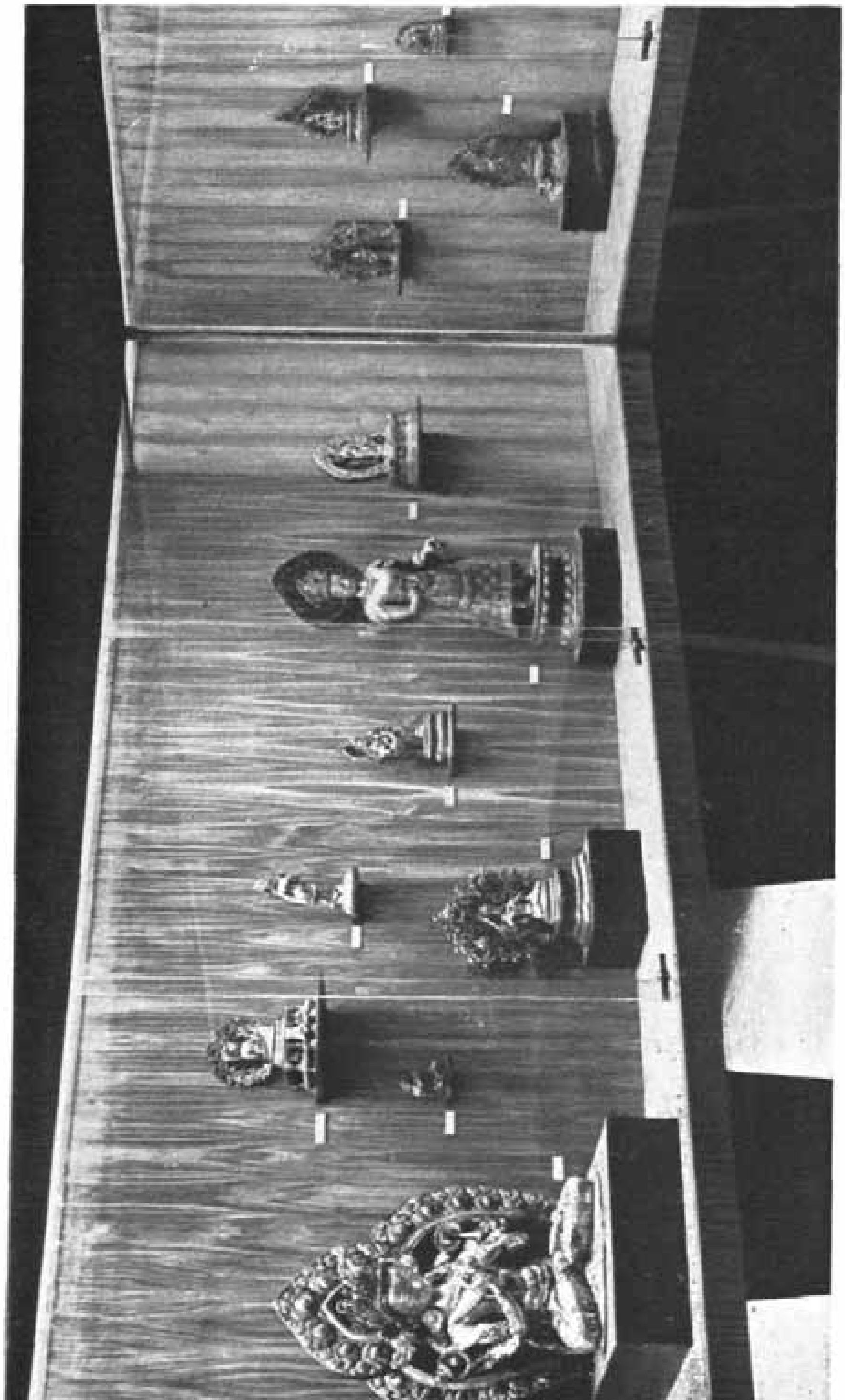


C

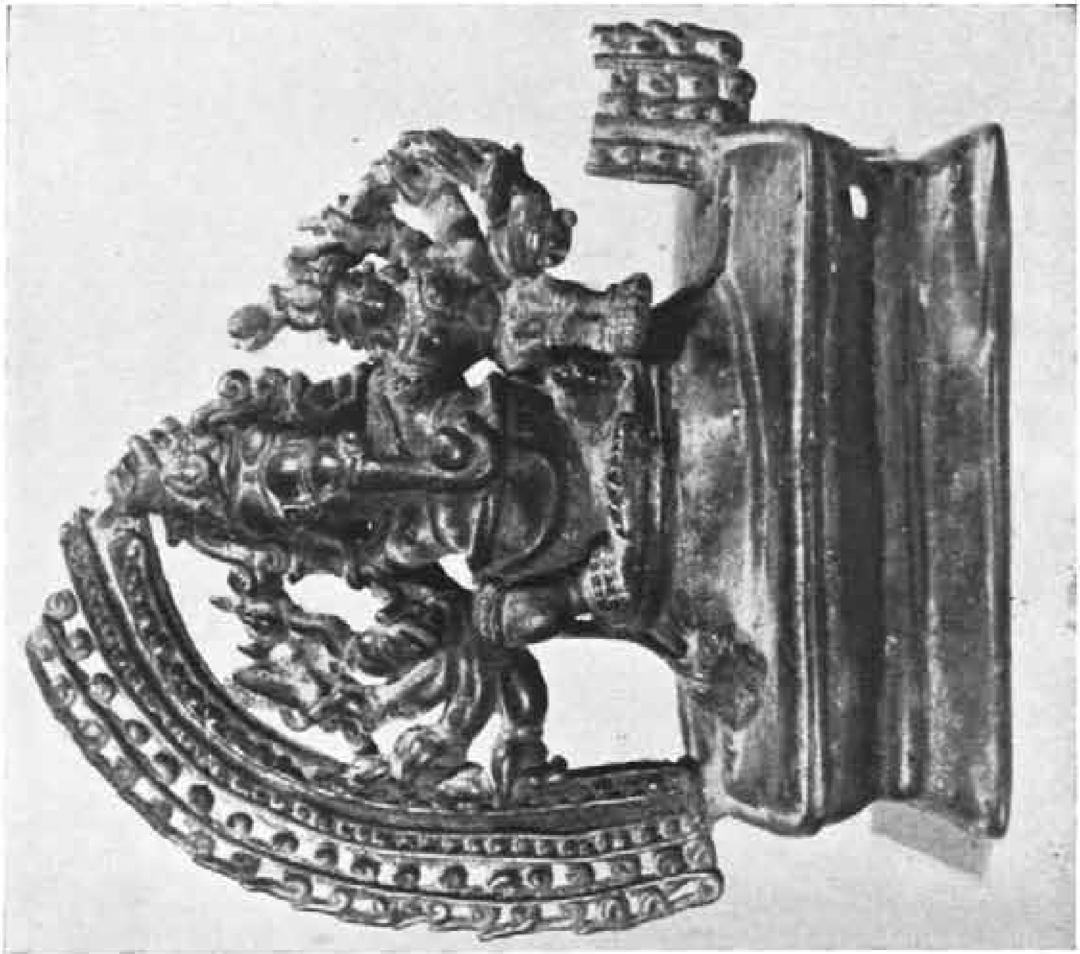


A

A, Asutosh Museum of Indian Art, Calcutta : inscribed bronze image; B, Government Museum, Mathura : headless Buddha image; and C, its two-lined Brahmi inscription. *See pp. 111 and 113*



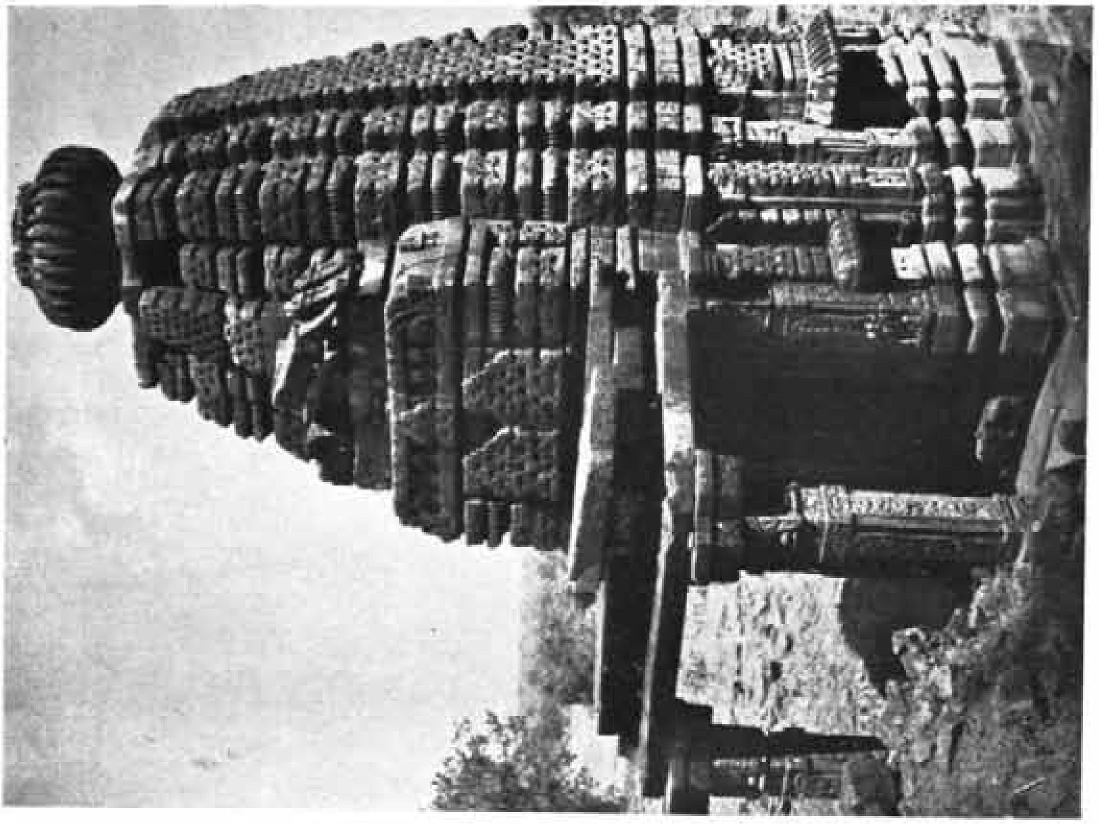
Indian Museum, Calcutta : a view of Nepalese-Tibetan Art Gallery. See p. 111



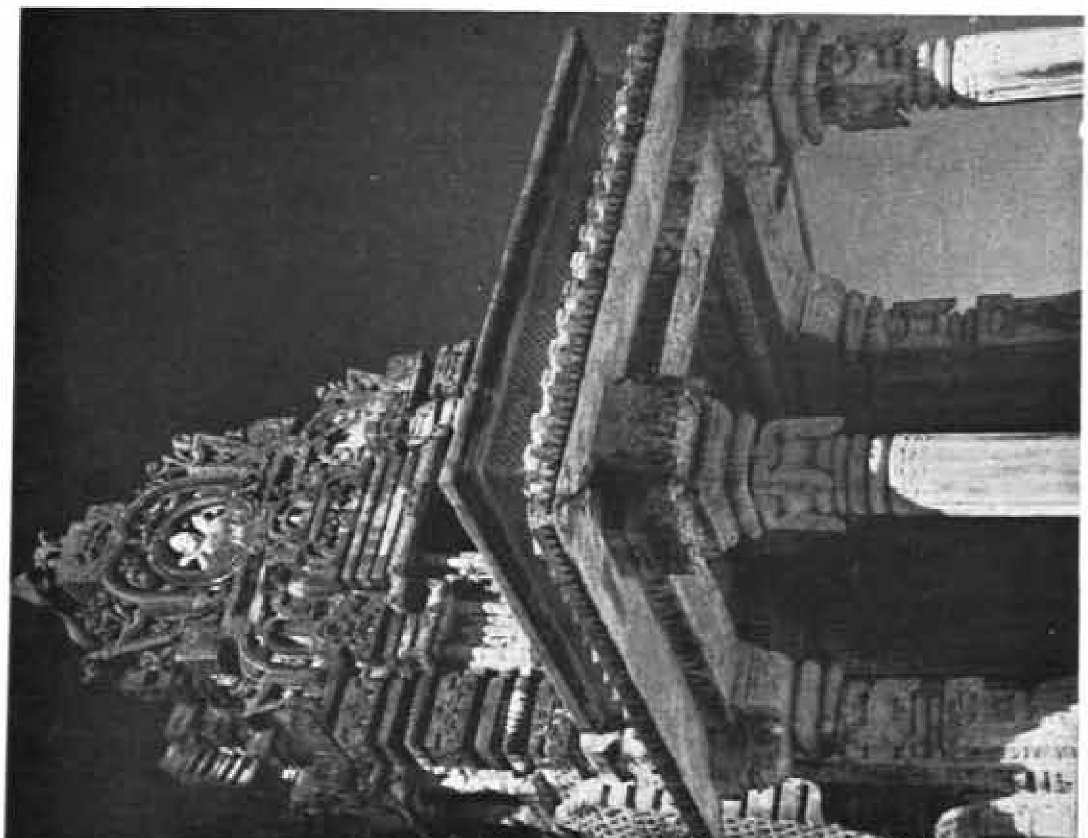


A B

National Museum, New Delhi: A, *bronze image of Siva*; and B, *Ganesa with Sakti*. *See p. 113*

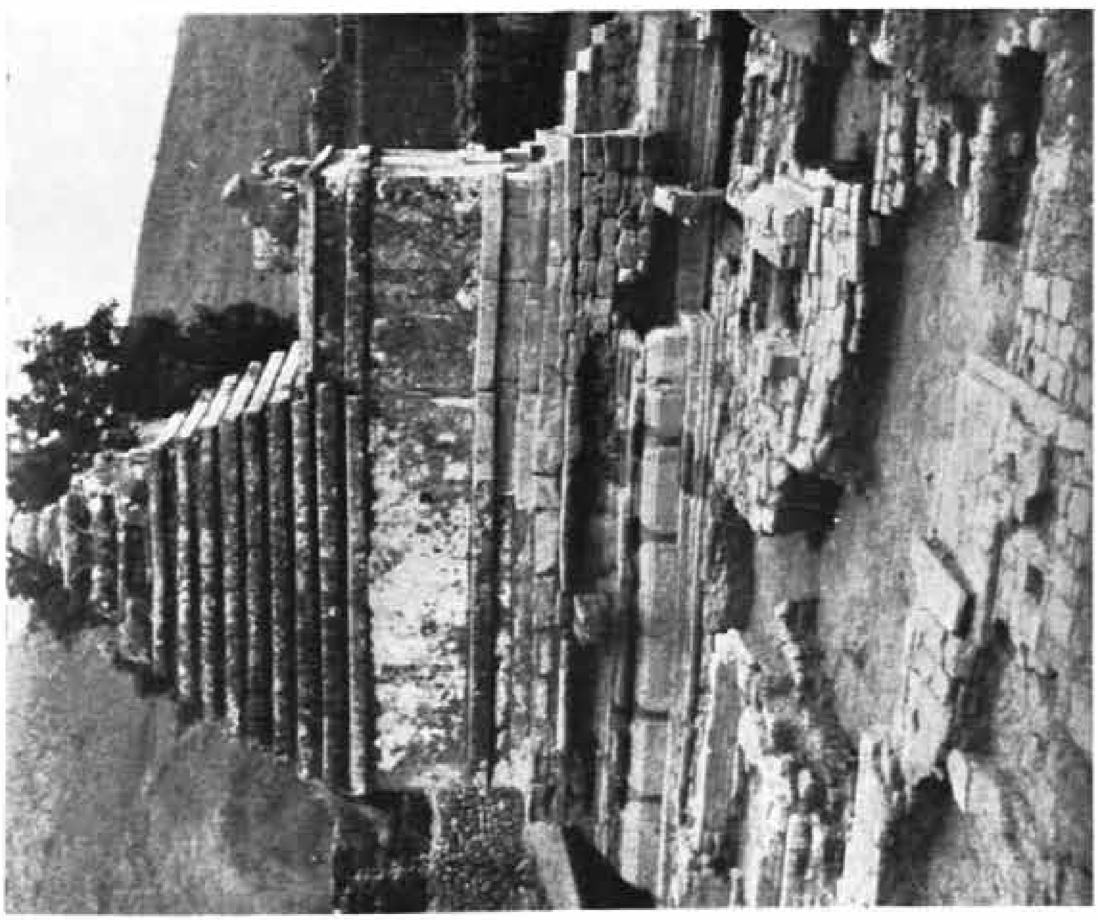


B

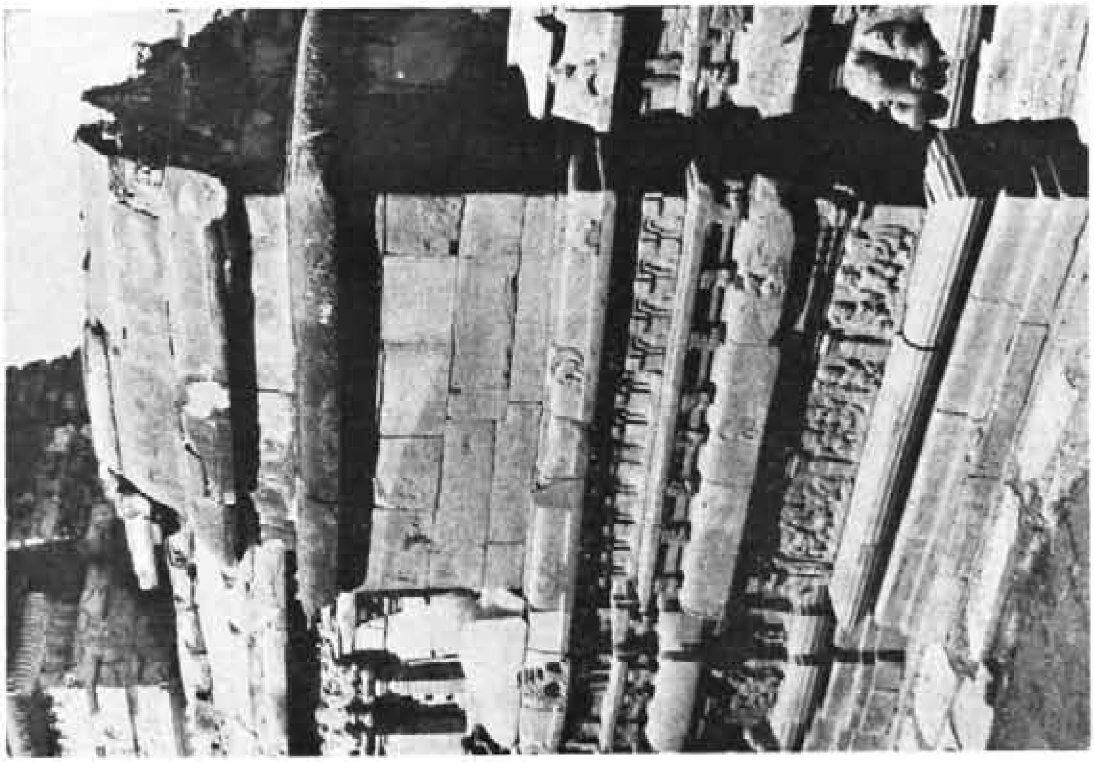


A

A, Markhera : Sun temple; B, Terahi : Siva temple. *See p. 115*

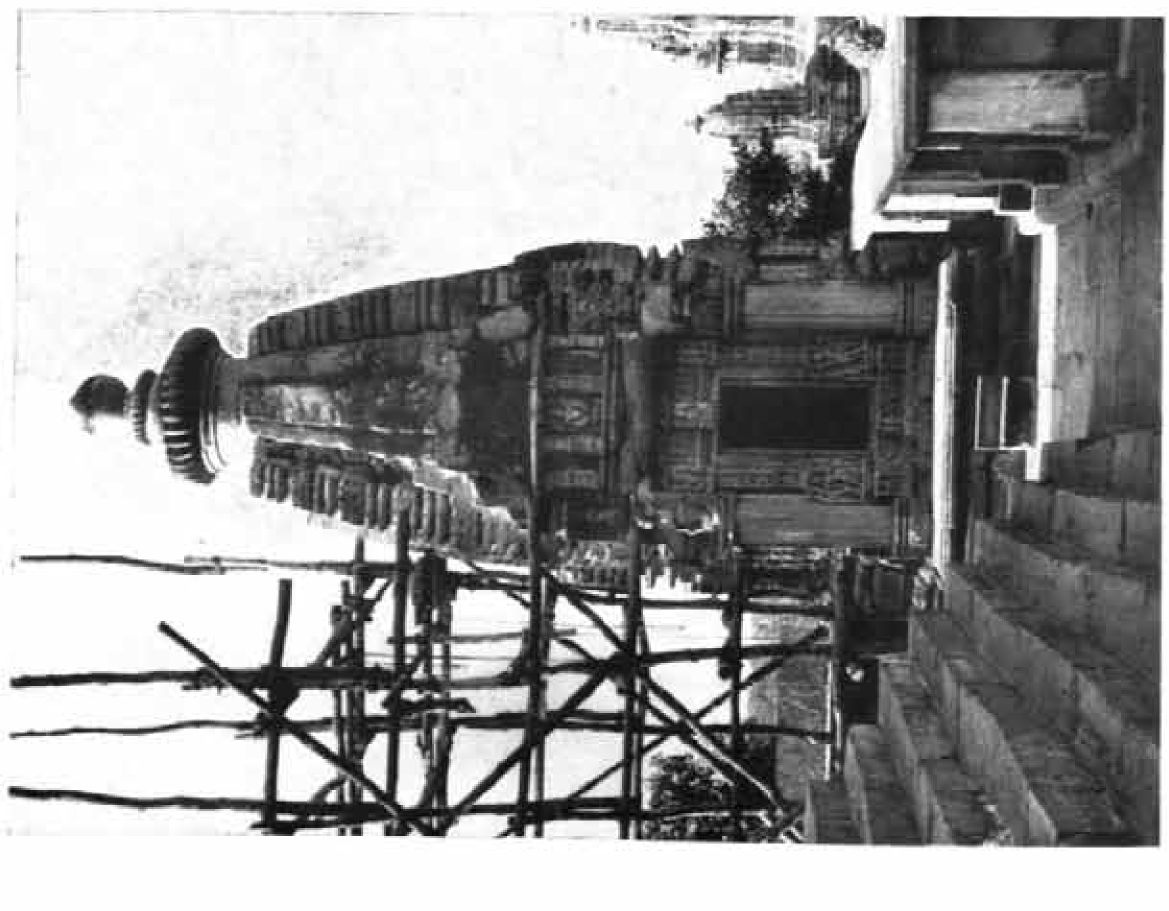


A

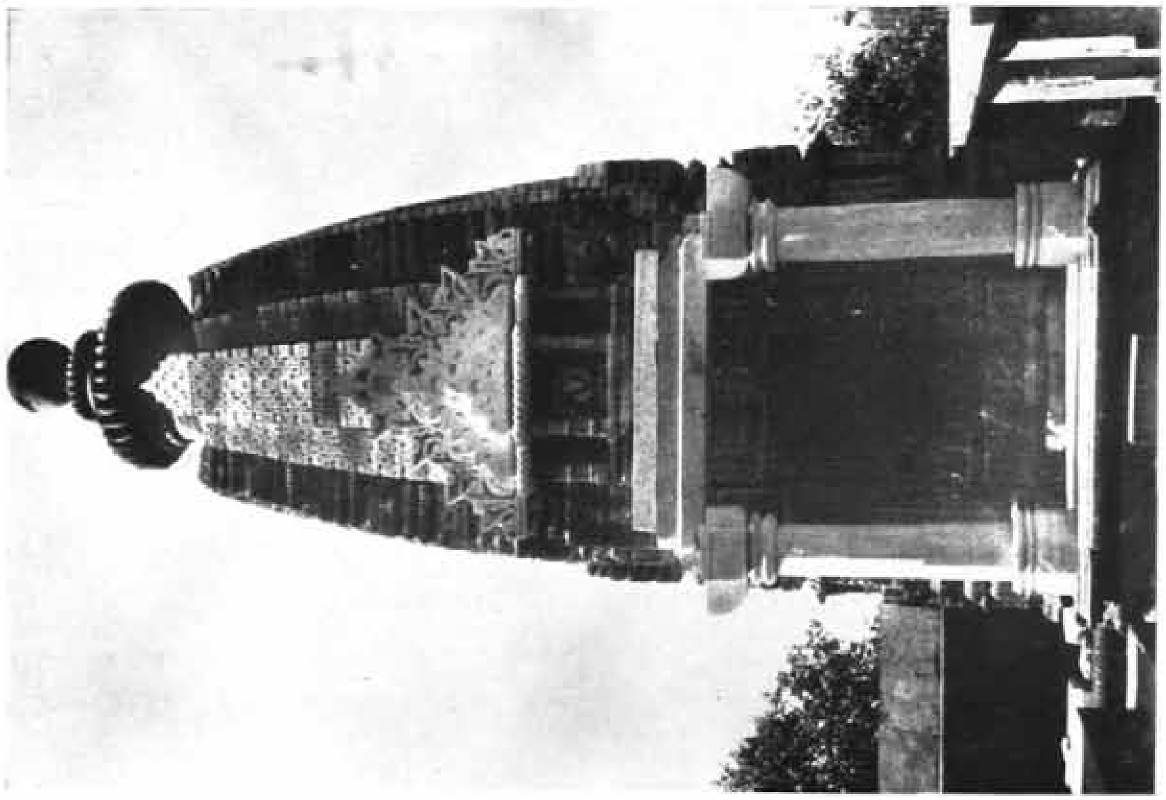


B

A. *Siddesvaram : earlier brick-structure below the stone-built Siddhesvaraswami temple;*
B. *Kudavelli : Sangamesvara temple, close up view of Matrika-subshrine.* *See pp. 116 and 118*



A

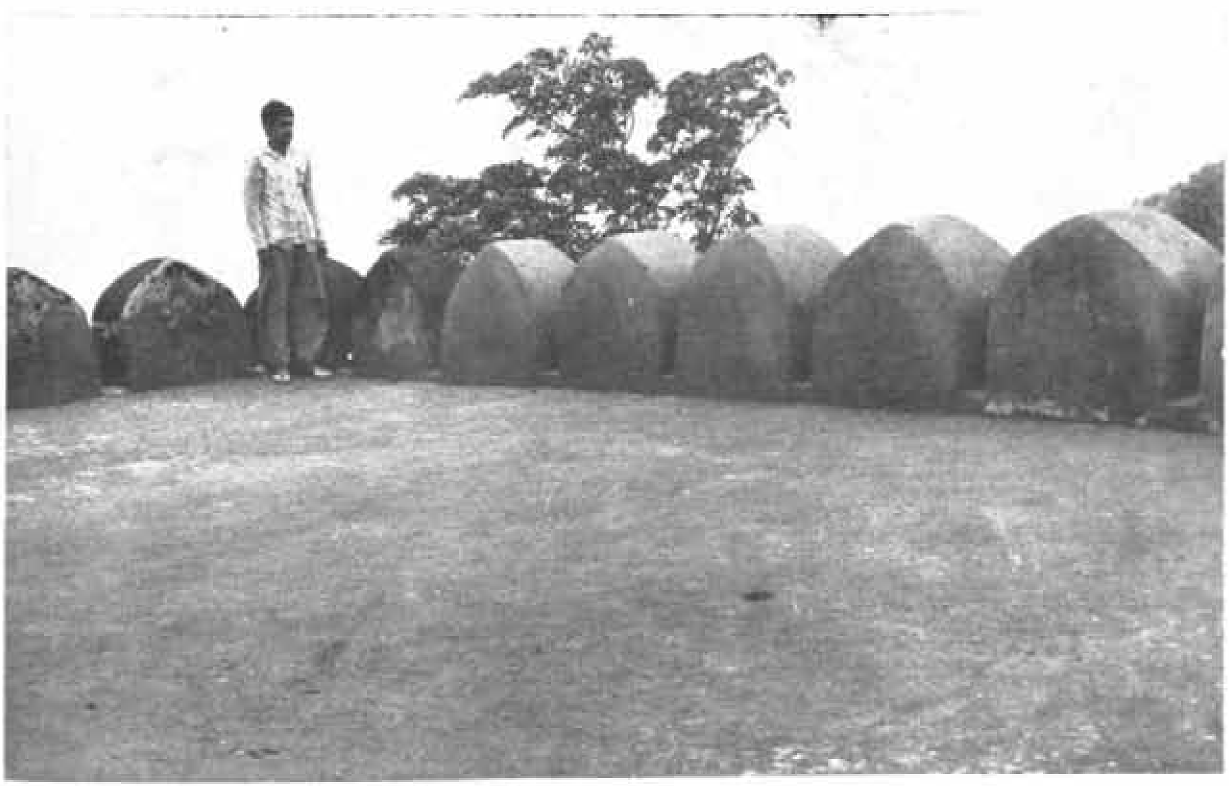


B

Khajuraho : *subsidiary shrine of Lakshmana temple*, A, *before conservation*; B, *after conservation*. *See p. 119*



A

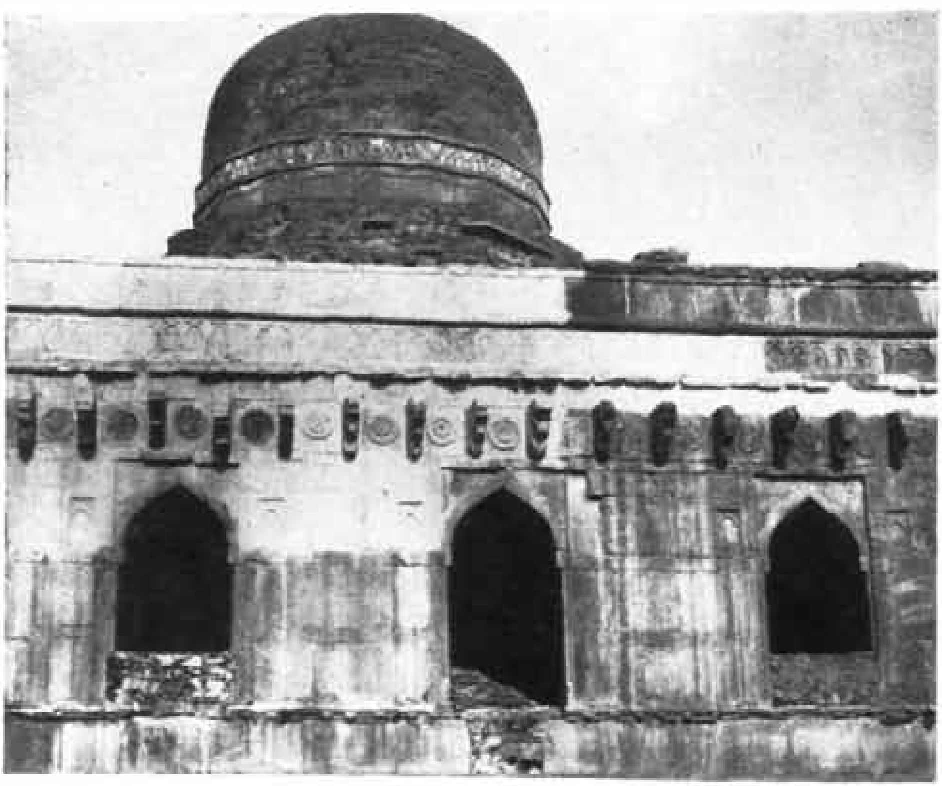


B

Mandu, Bhagwania gate : A, *before and* B, *after conservation of roof.* *See p. 119*

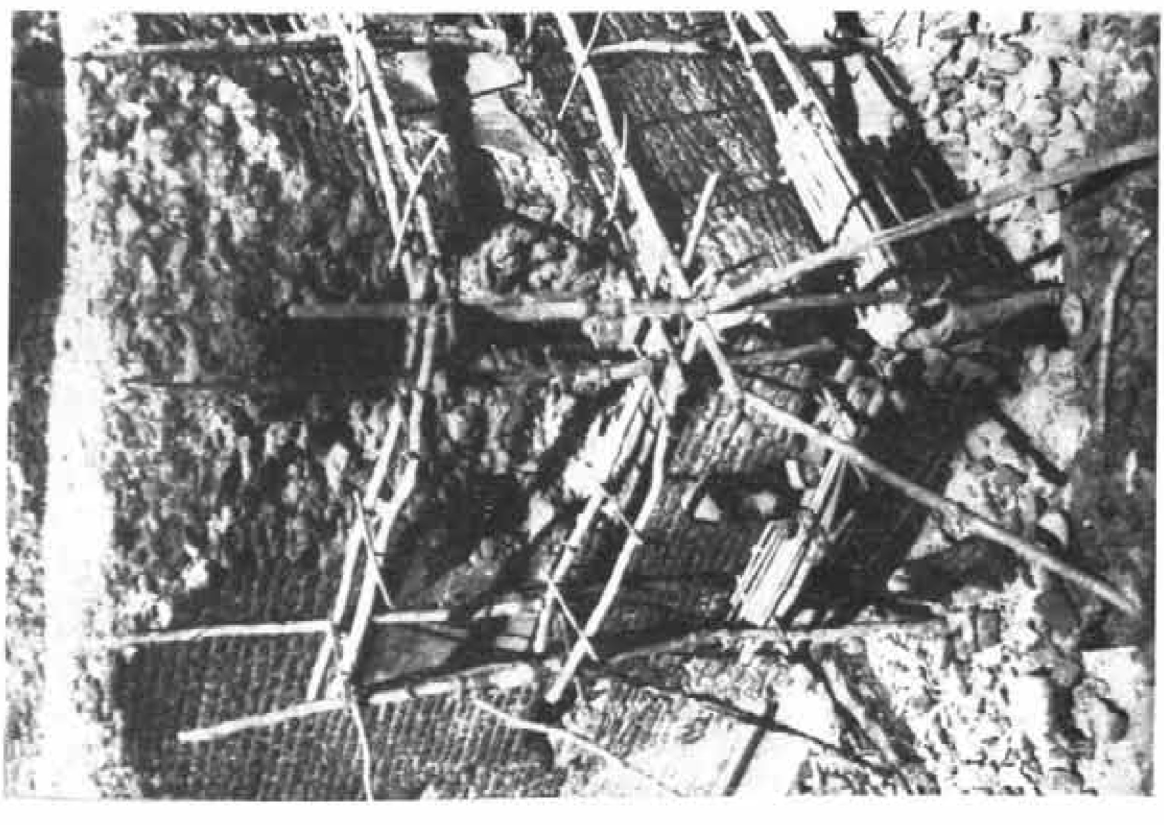


A

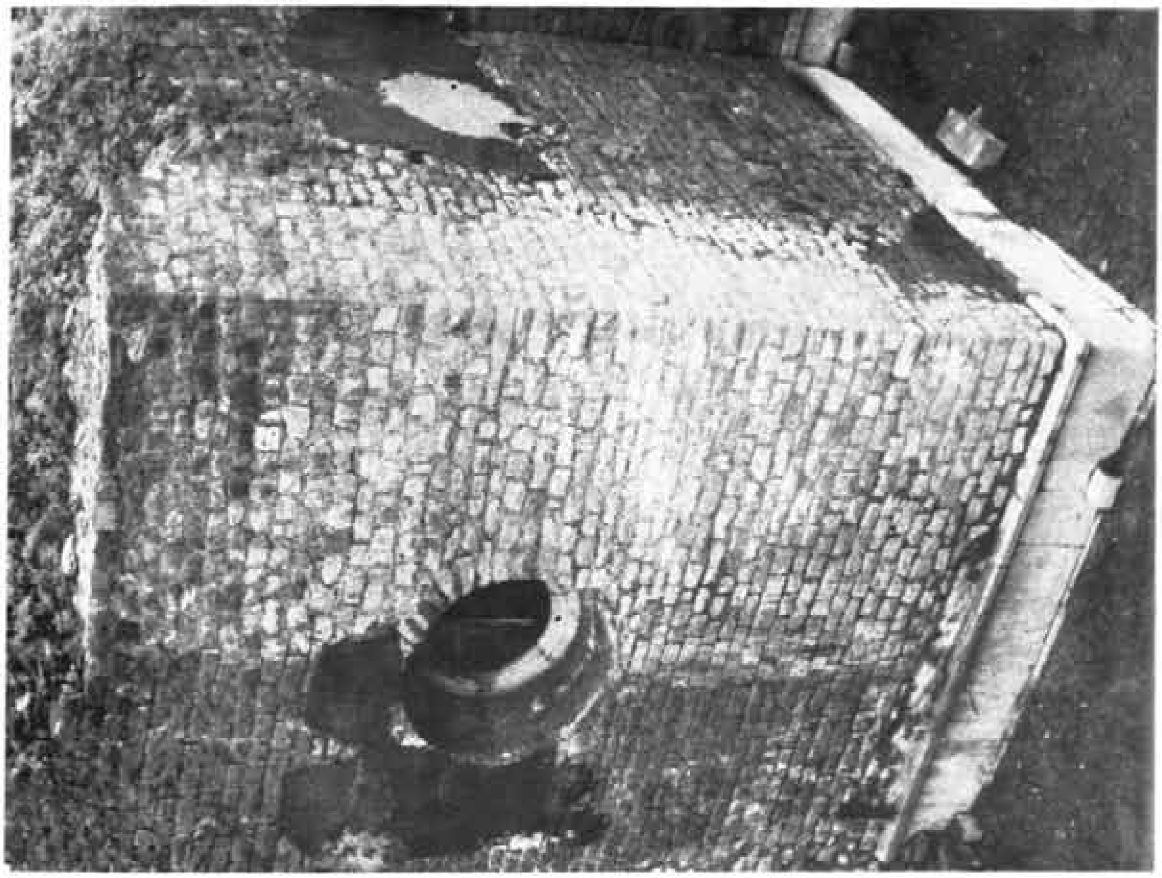


B

Mandu, Dai-ki-Choti Bahen ka Mahal : A, *before* and B, *after conservation*. *See p. 119*

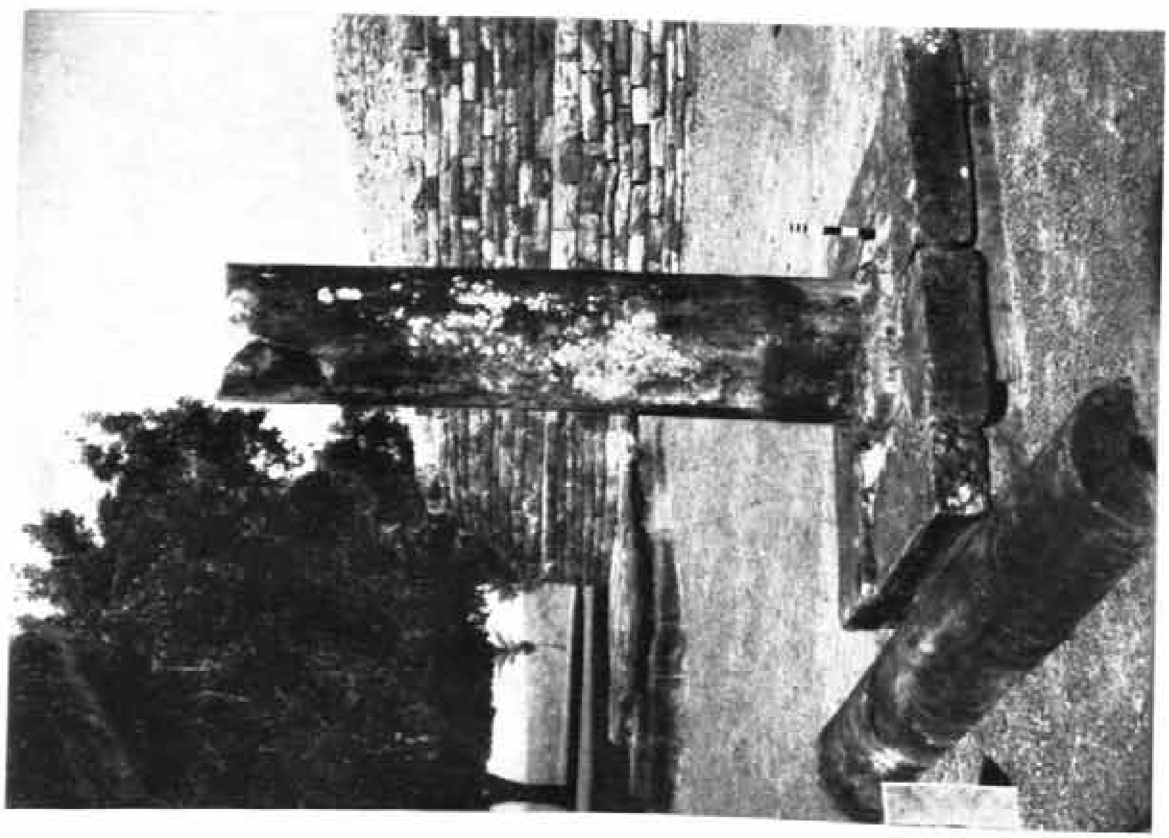


A

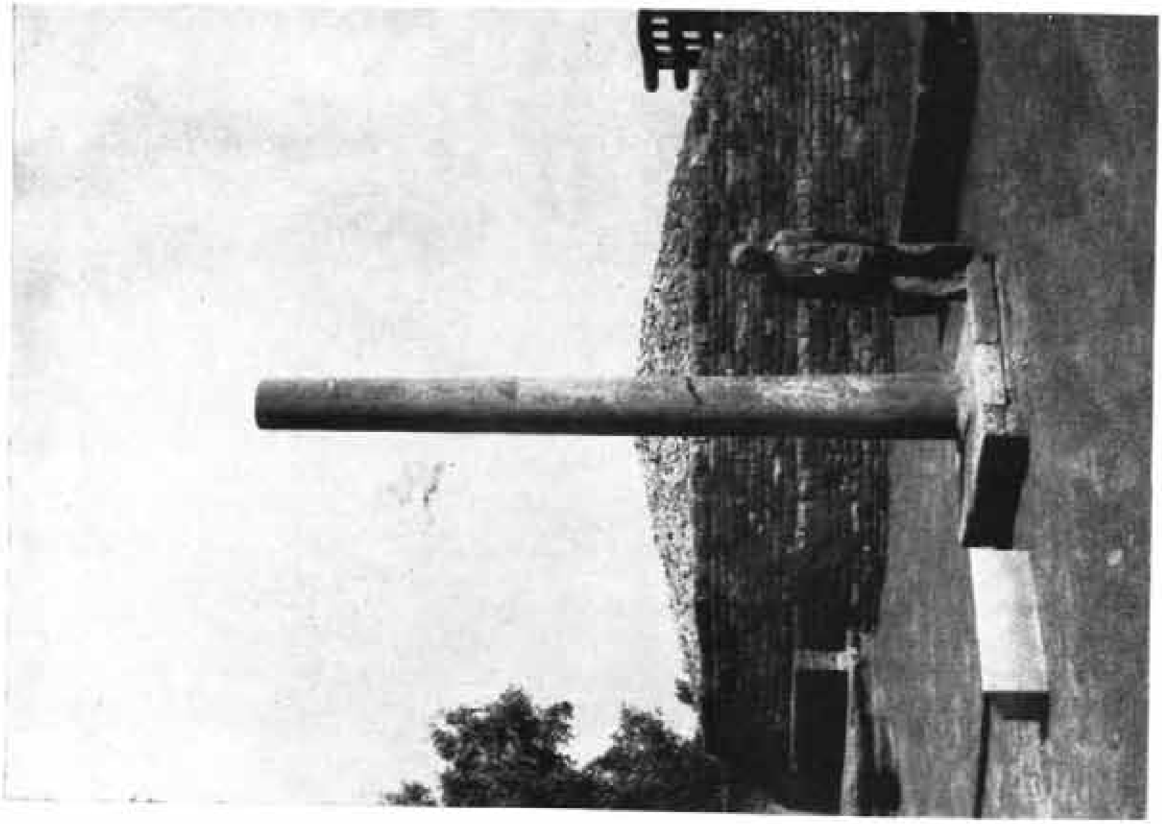


B

Mandu, Royal palaces (northern group): A, before and B, after conservation. *See p. 120*



A



B

Sanchi, pillar 26 : A, before and B, after joining and conservation. *See p. 123*

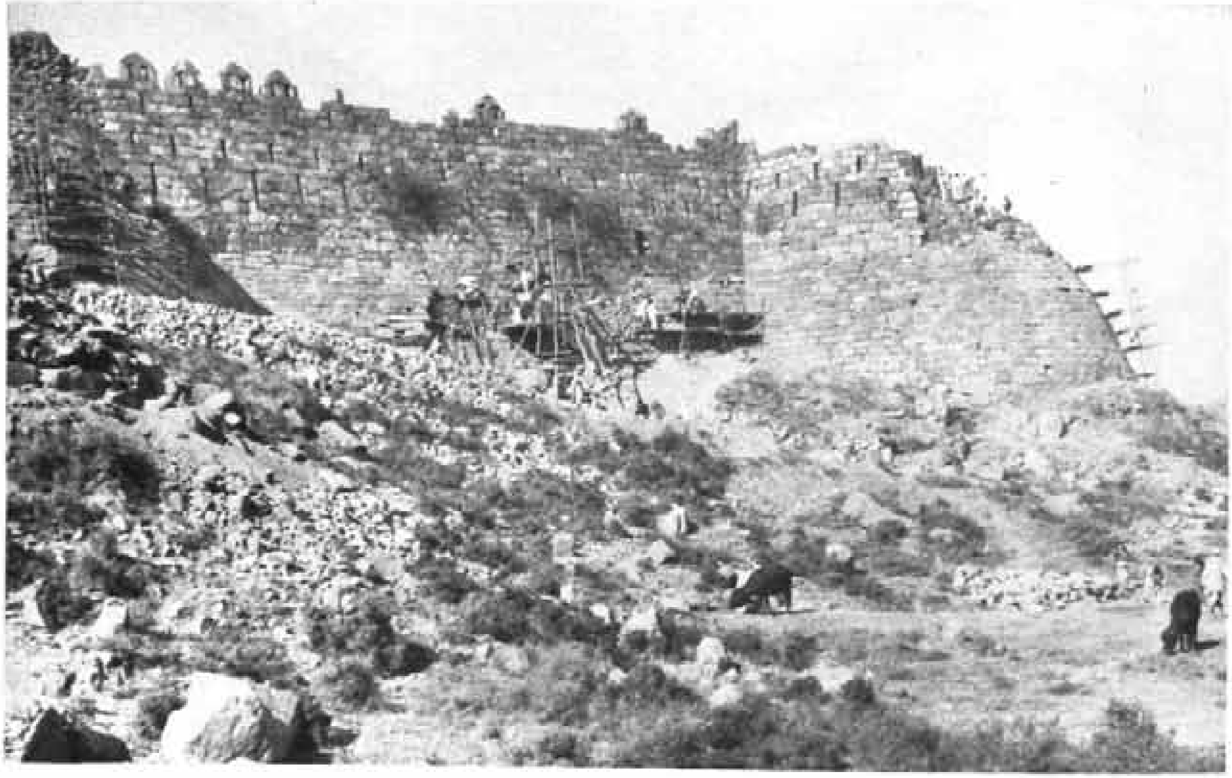


A

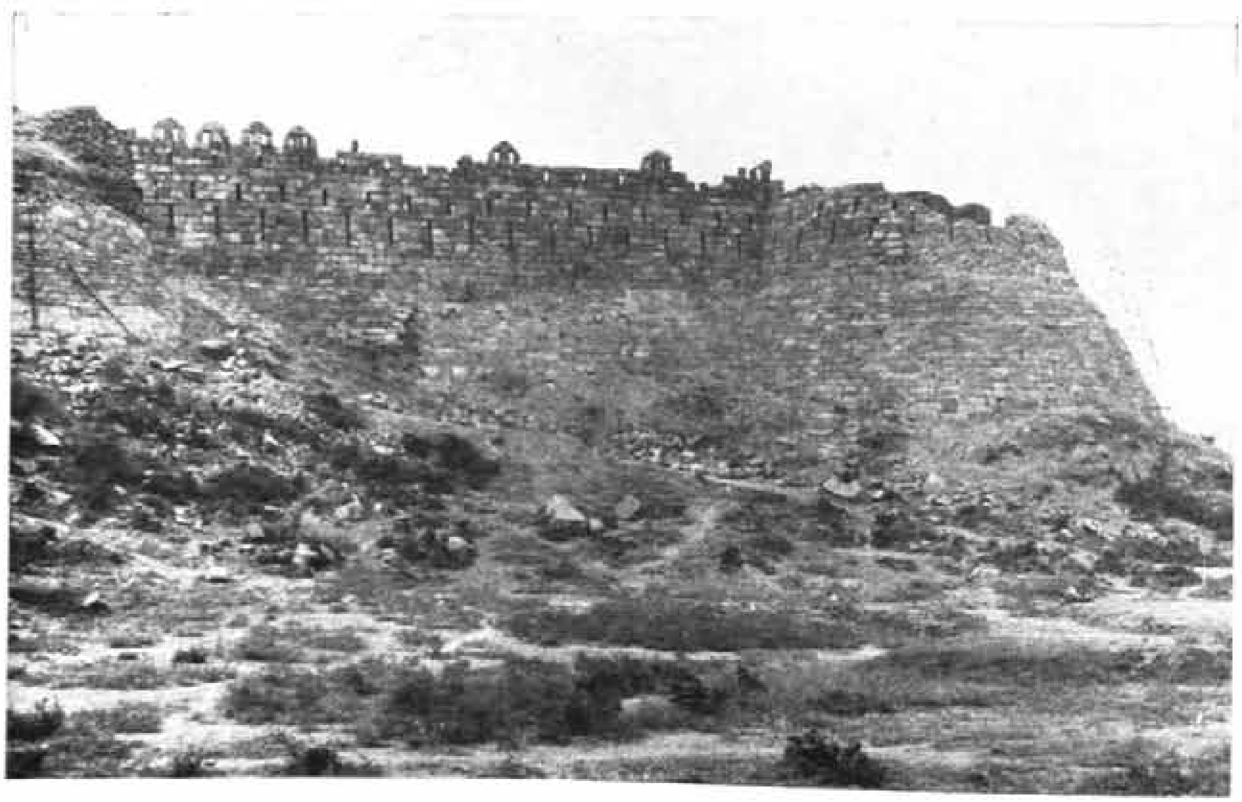


B

Sonari, stupa I : A, *before and* B, *after conservation*. *See p. 123*

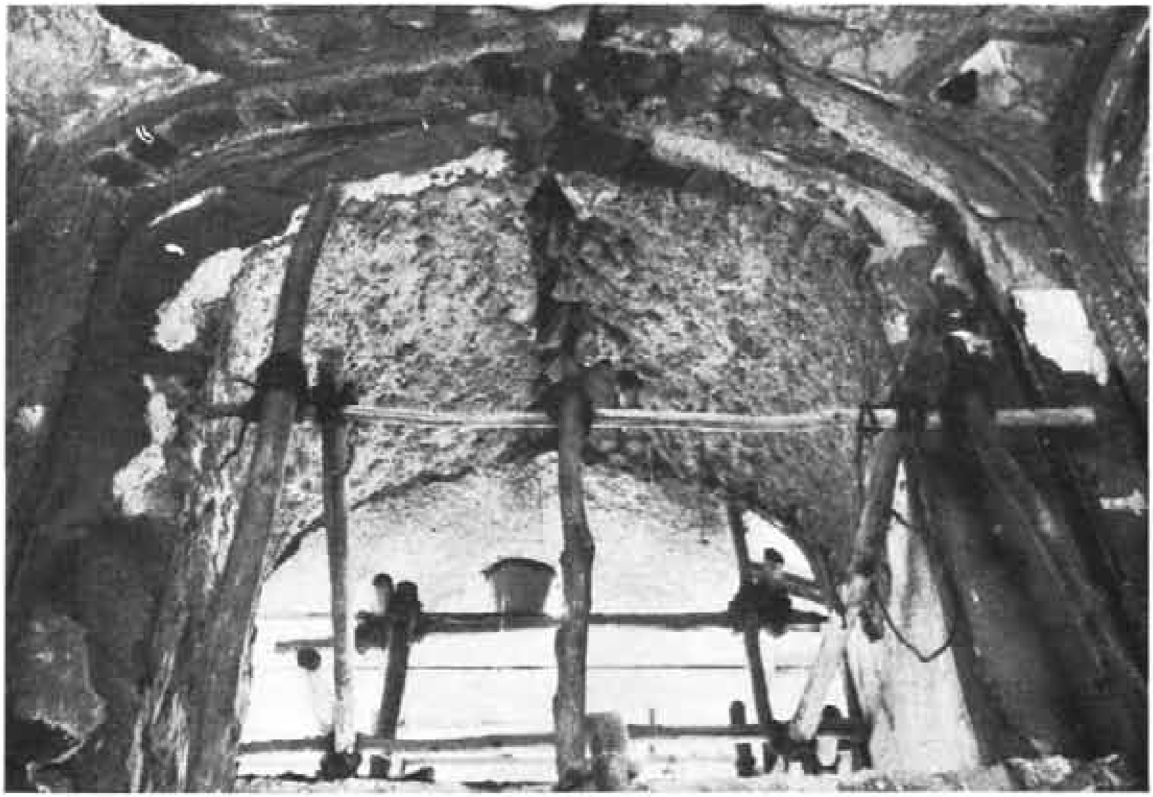


A



B

Delhi, Adilabad : A, *during and* B, *after conservation of fort wall.* *See p. 123*



A



B

Delhi, Subj Burz : A. *before and* B. *after conservation.* *See p. 124*



A



B

Bharatpur; Jawahar Burz : A, *during and* B, *after conservation.* *See p. 124*



A



B

Jayasagar, Ranghar Pavilion : work in progress. *See p. 124*



A



B

Bhubaneswar, Bakesvara temple : work in progress. *See p. 125*

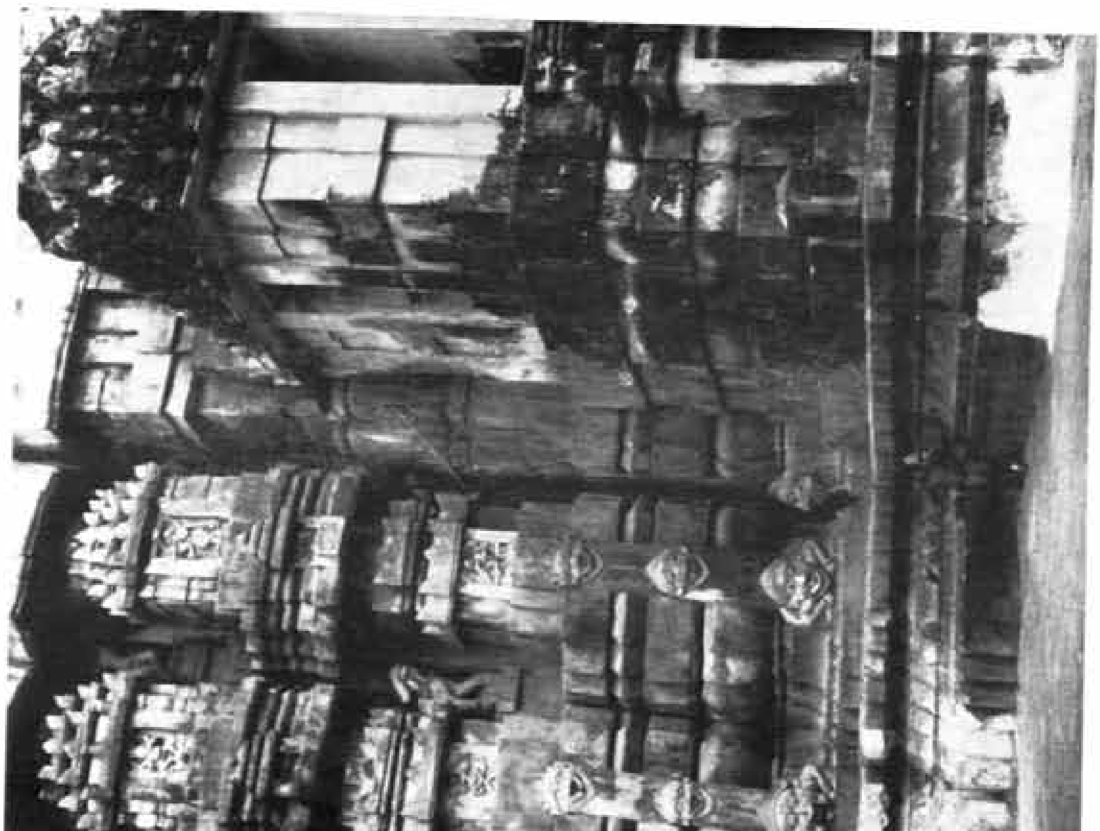


A

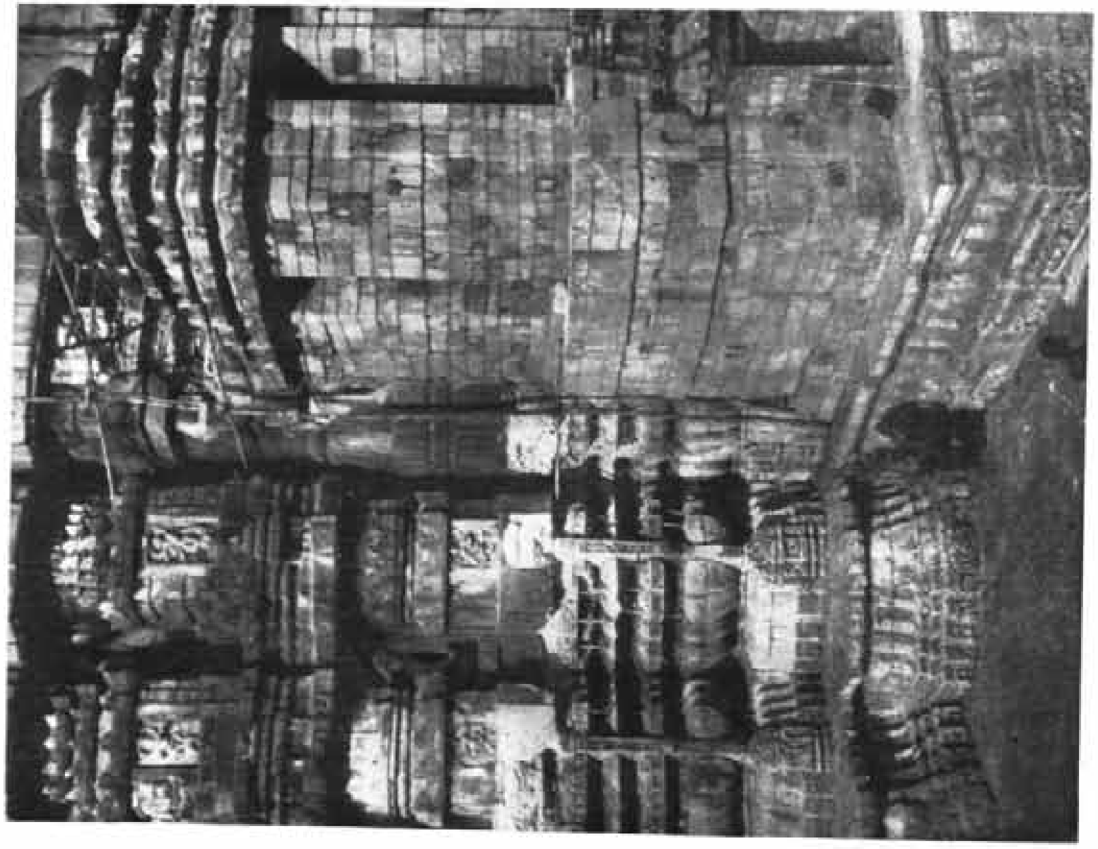


B

Puri, Jagannath temple : A, *before and* B, *after removal of plaster.* *See p. 125*

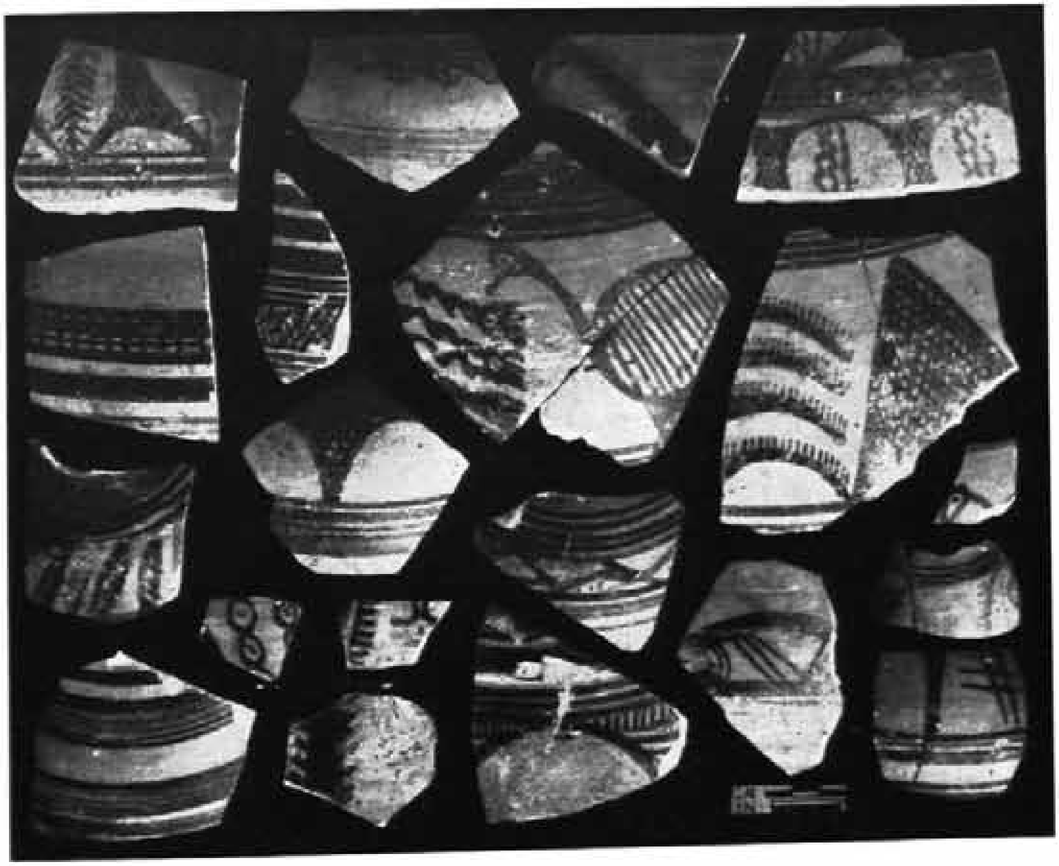


A



B

Puri, Jagannath temple : A, before and B, after removal of plaster. See p. 125



A



B

Hulas : A, *Harappan pottery*; *and* B, *terracotta cakes.* *See p. 60*

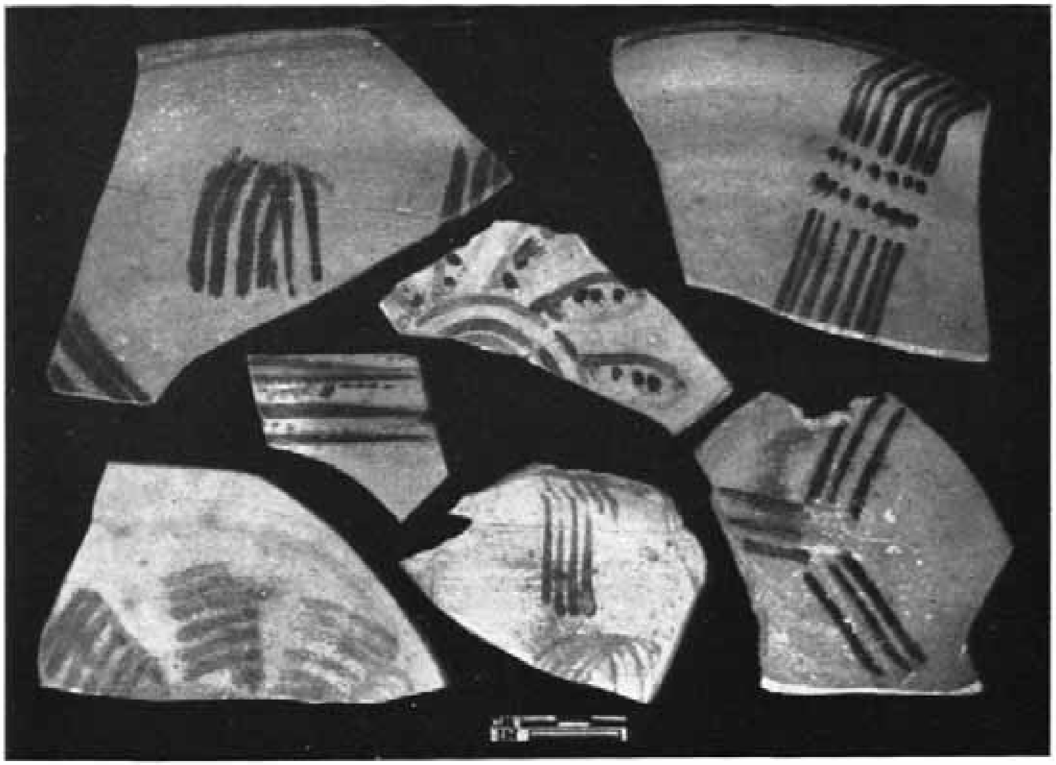


B

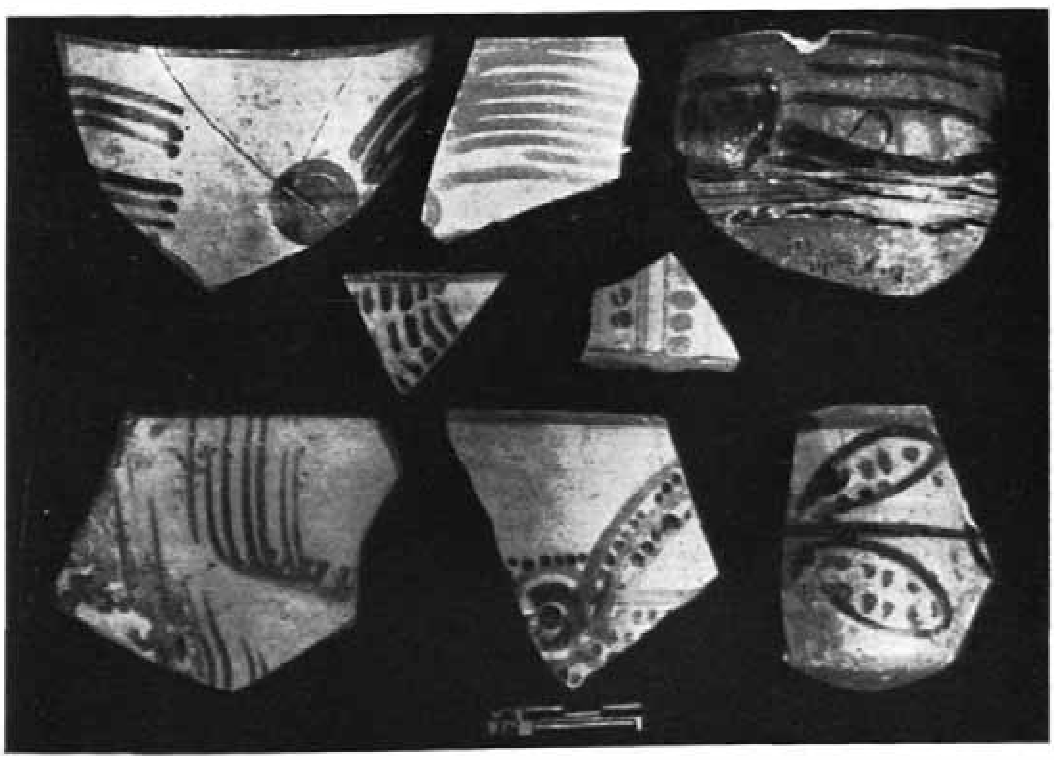


A

Hulas : A, oval-shaped hearth of Period I; B, moulded pottery, Period V. *See pp. 60-61*



A

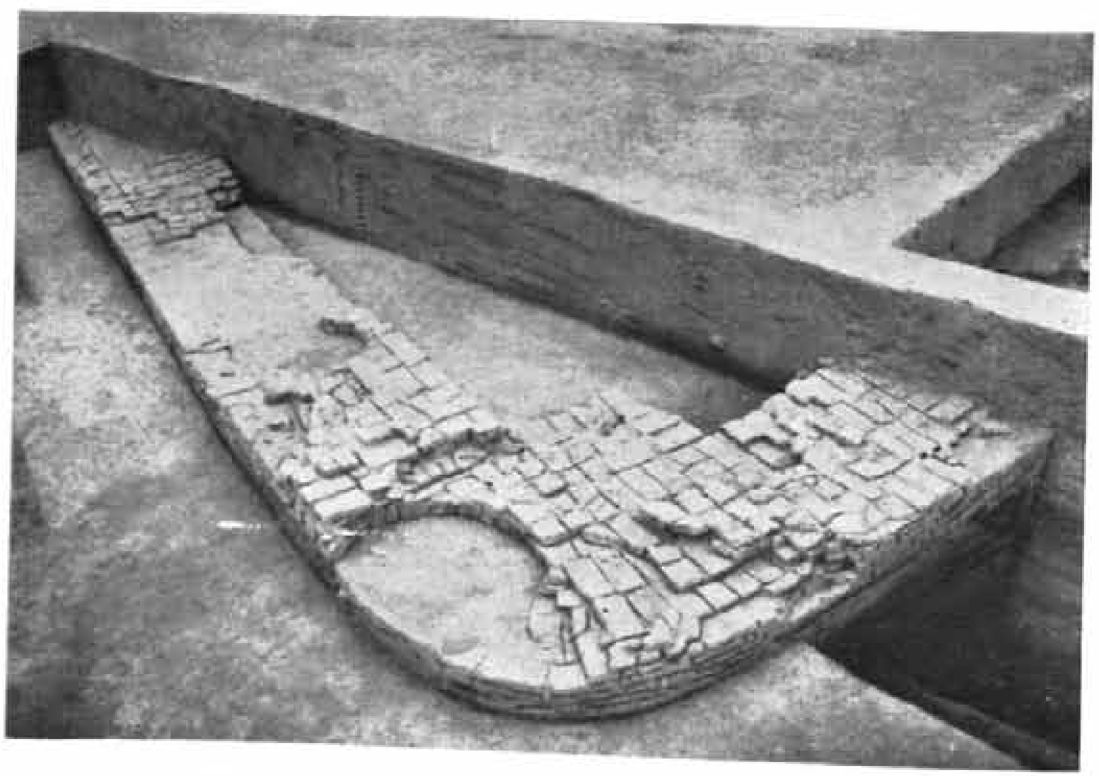


B

Hulas : Painted Grey Ware sherds, Period II. *See p. 60*

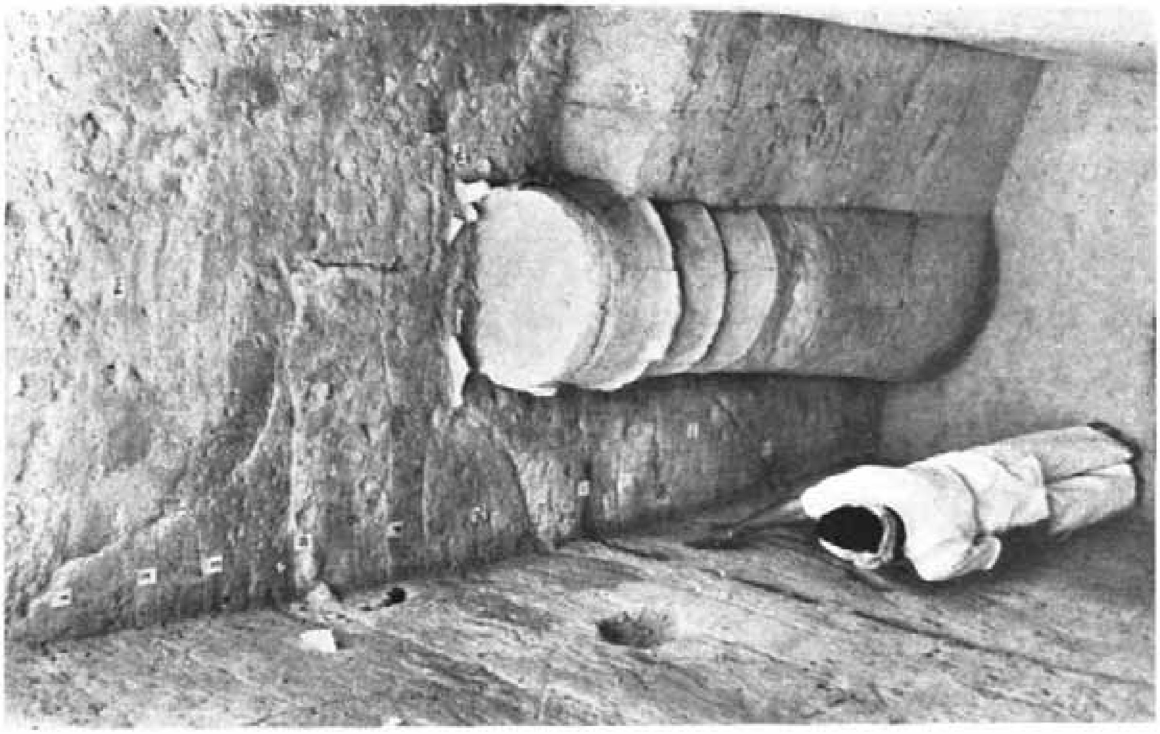


A



B

Hulas : A, *double storage jar*; B, *brick structure* (*Period IV*). *See p. 61*





A B

Purana : A, Trench PRR-3; B, terracotta ring-well. See pp. 61-62



A



B

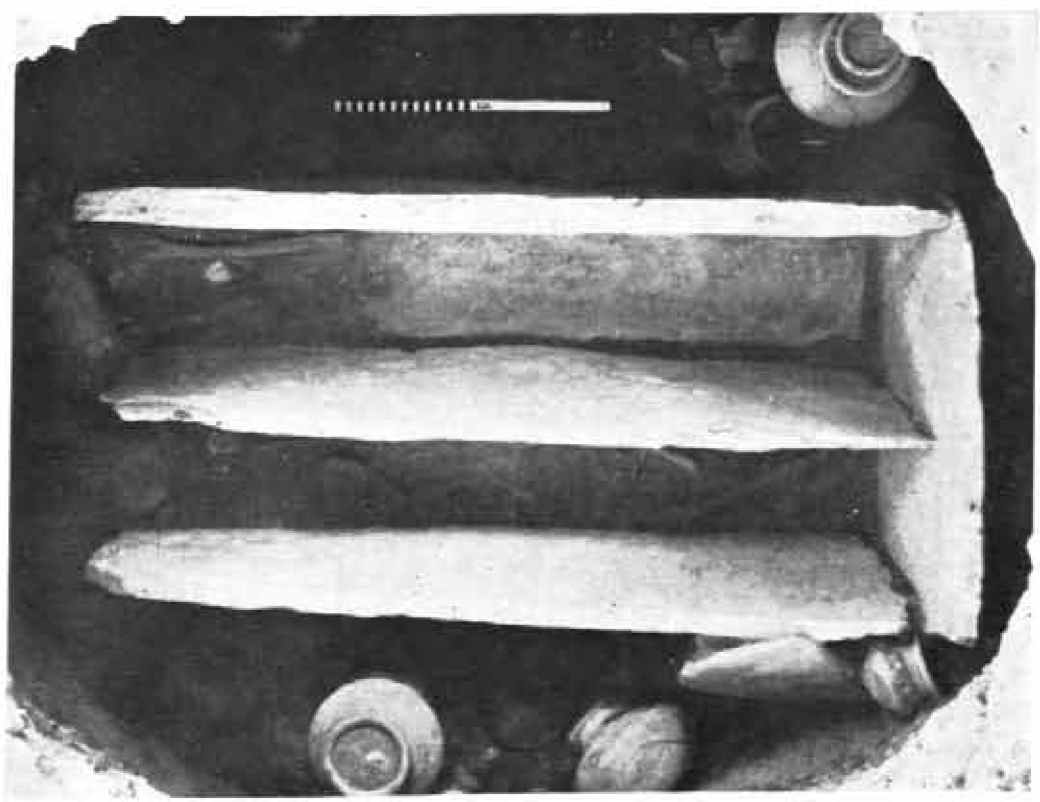


C

Keesaragutta: A, *excavated structures*; B, *plaque depicting mother goddess*; C, *ornamental pot.* *See pp. 63-64*

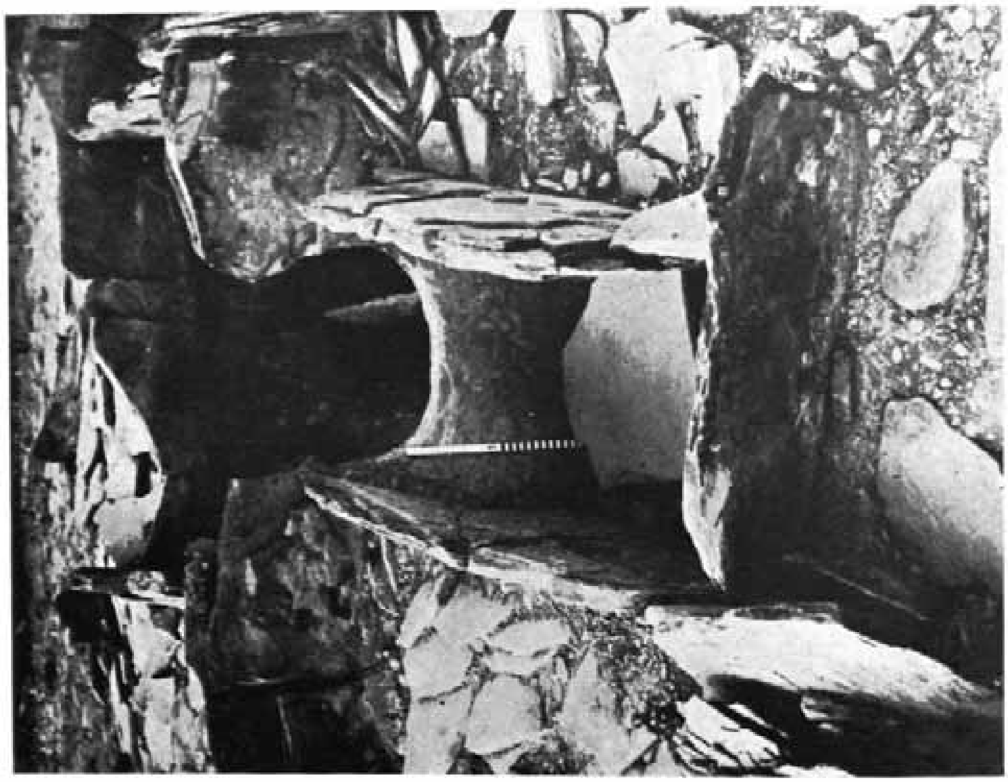


A



B

Uppalapadu : A, *pit-burial*; B, *cist-burial*. *See pp.* 65-66





A B

Uppalapadu : A, three cists in pit, B, cist without interments. *See pp.* 65 *and* 66

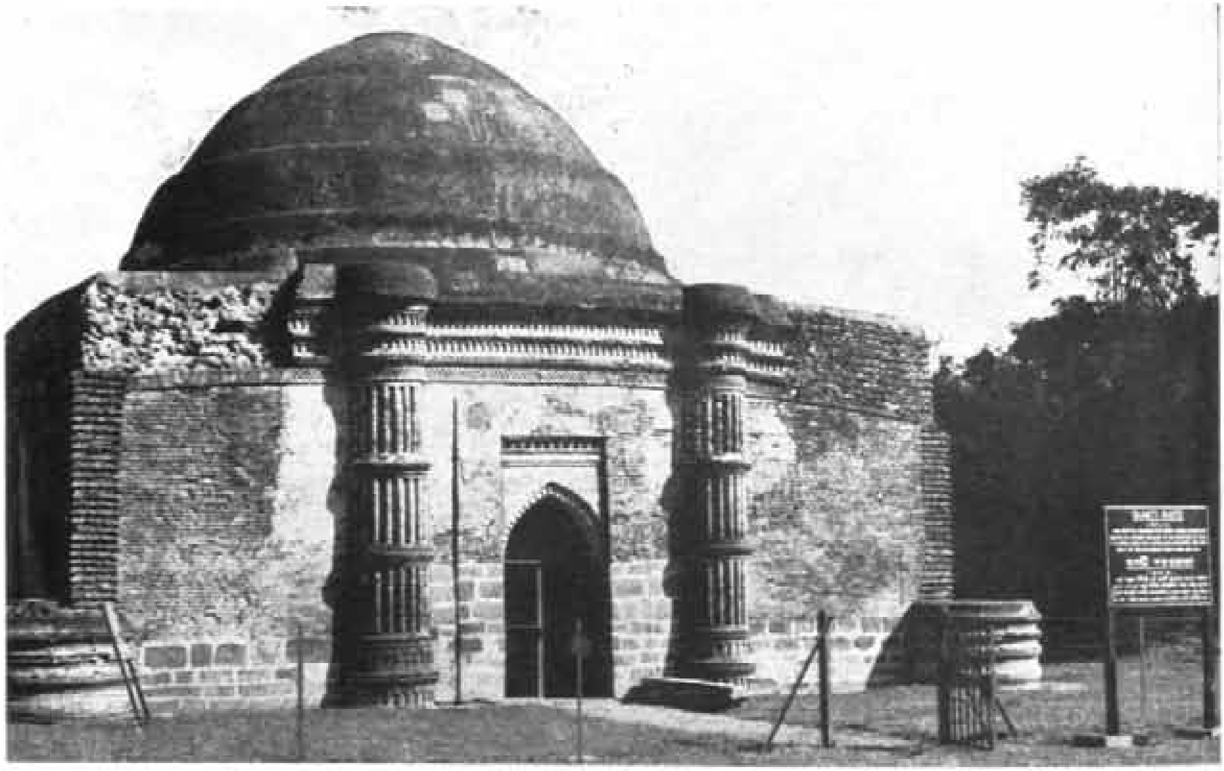


A

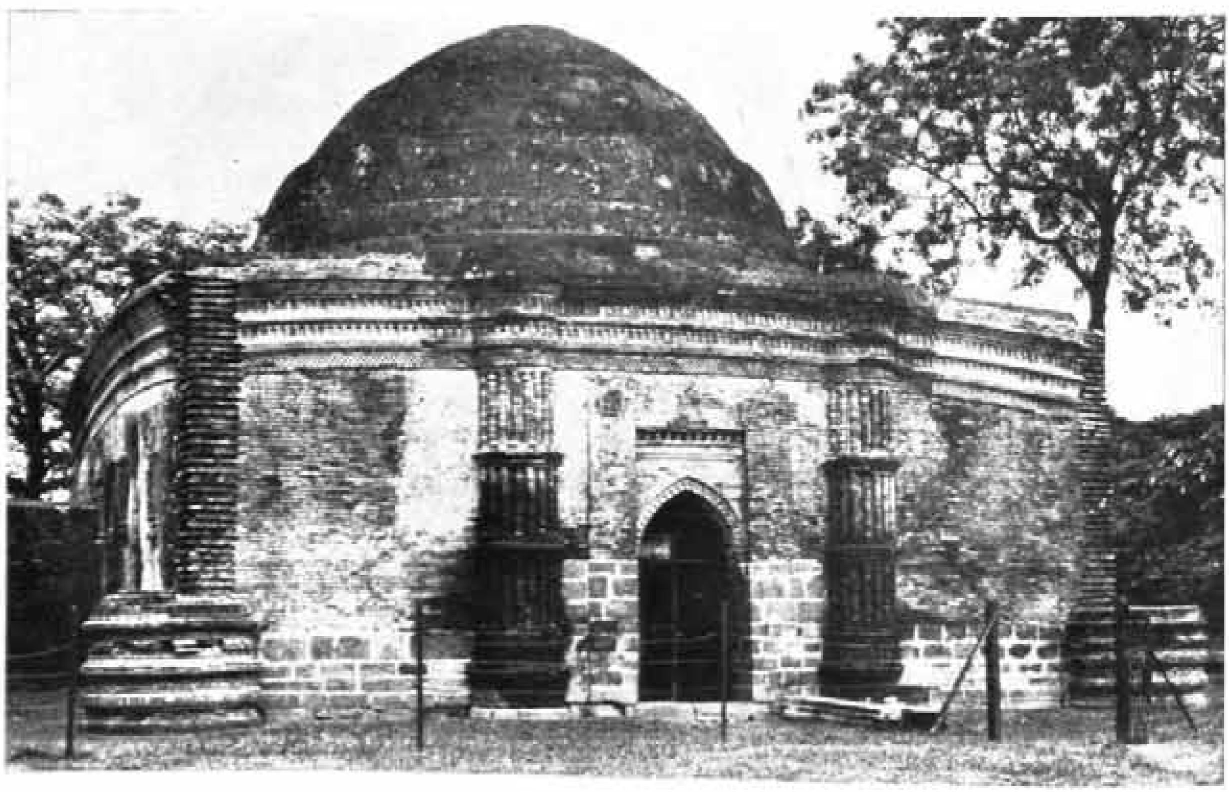


B

Rajnagar, Bhubaneswari temple : A, *before and* B, *after conservation.* *See p. 125*

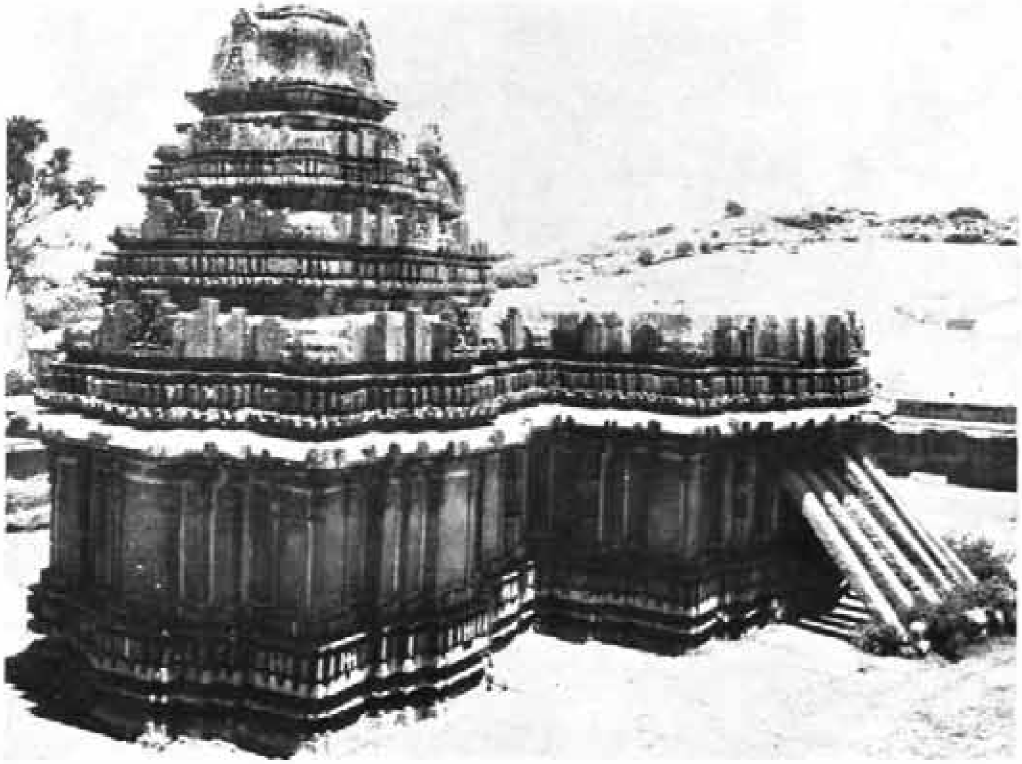


A

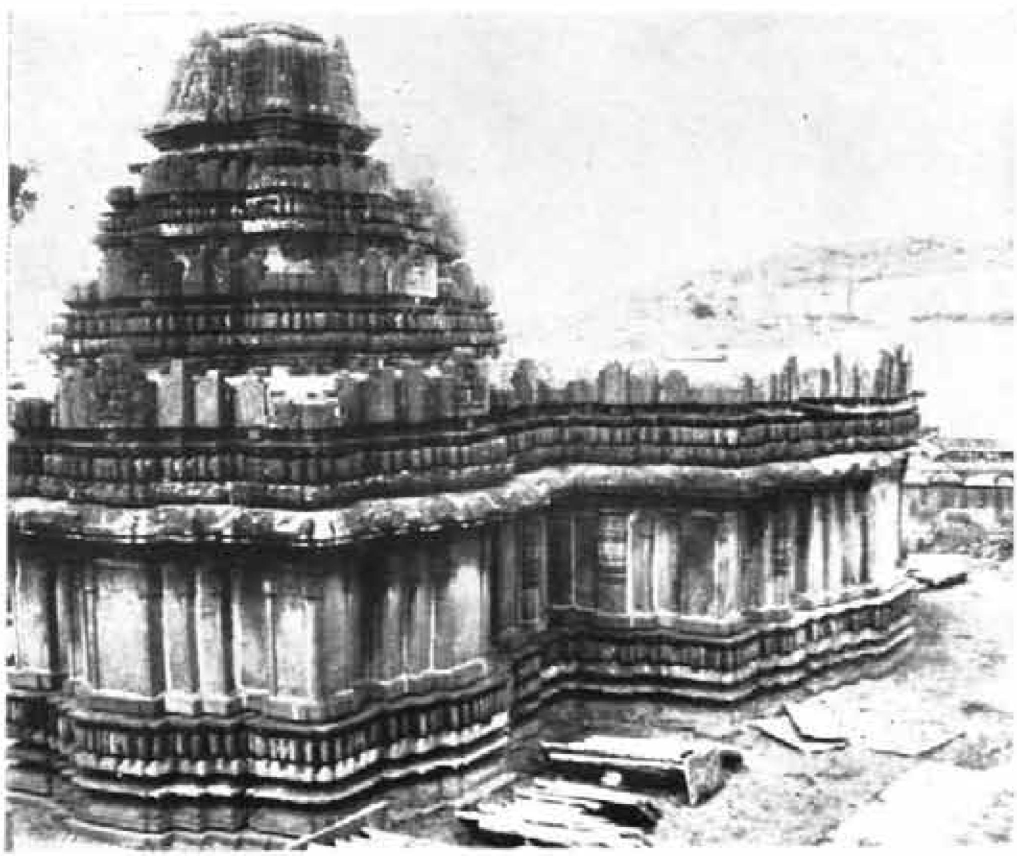


B

Gaur, Gumti Gateway : A, before and B, after conservation. See p. 126

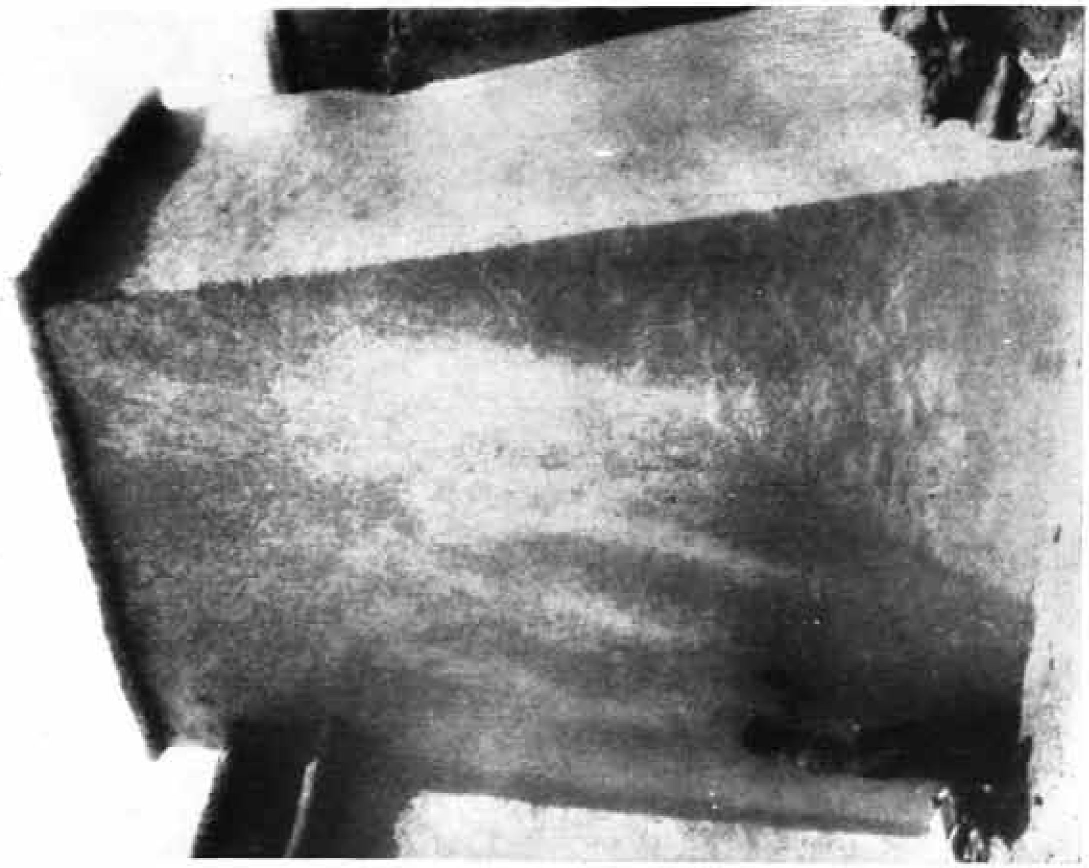


A



B

Sravanabelgola, Akkana basti : A, *before* B, *after conservation.* *See p. 180*



B

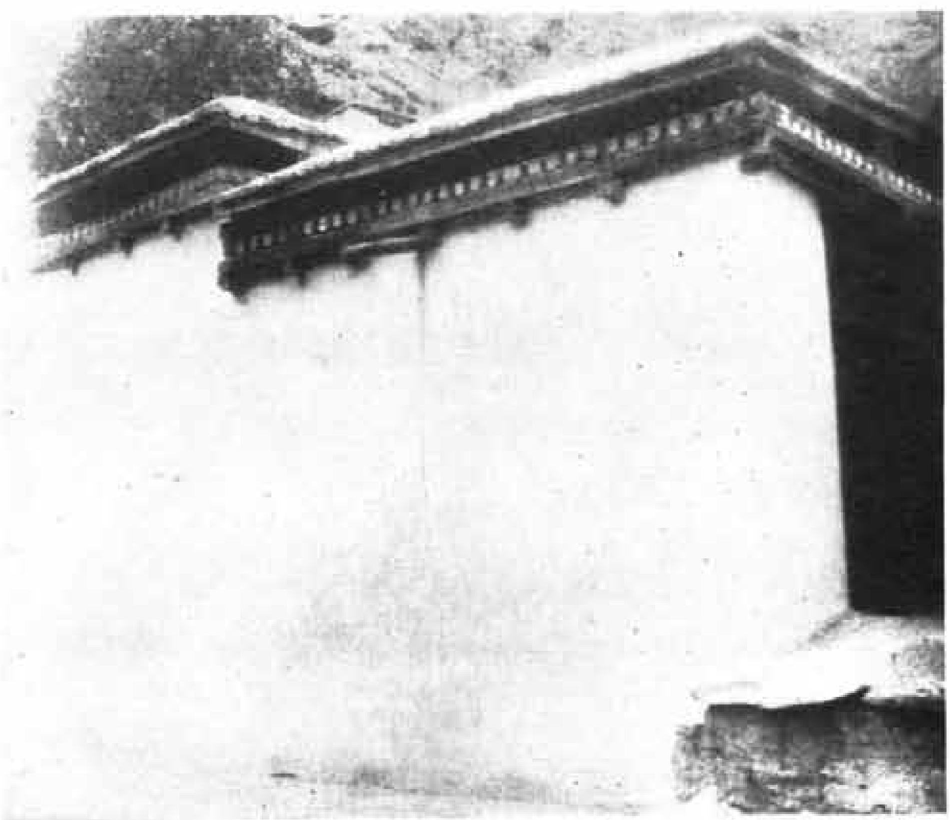


A

Alchi, Buddhist monastery : A, before B, after conservation. See p. 136

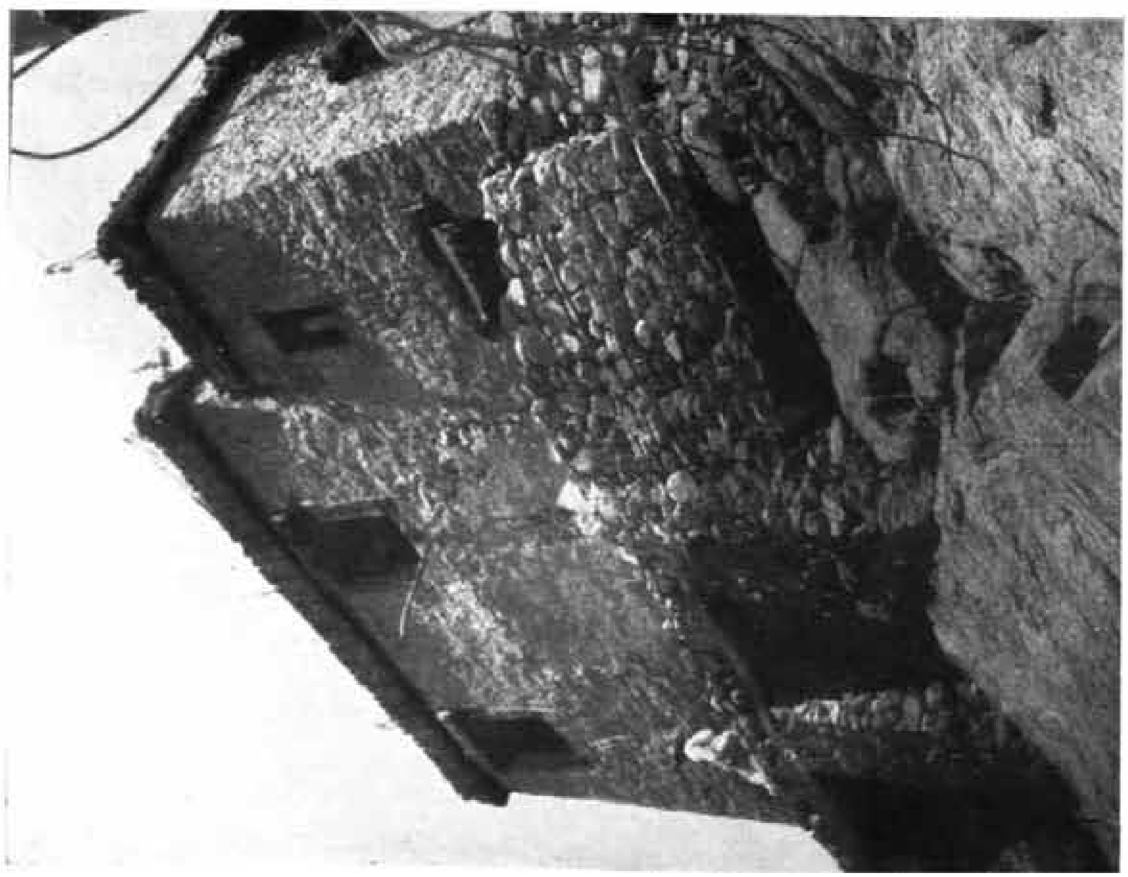


A

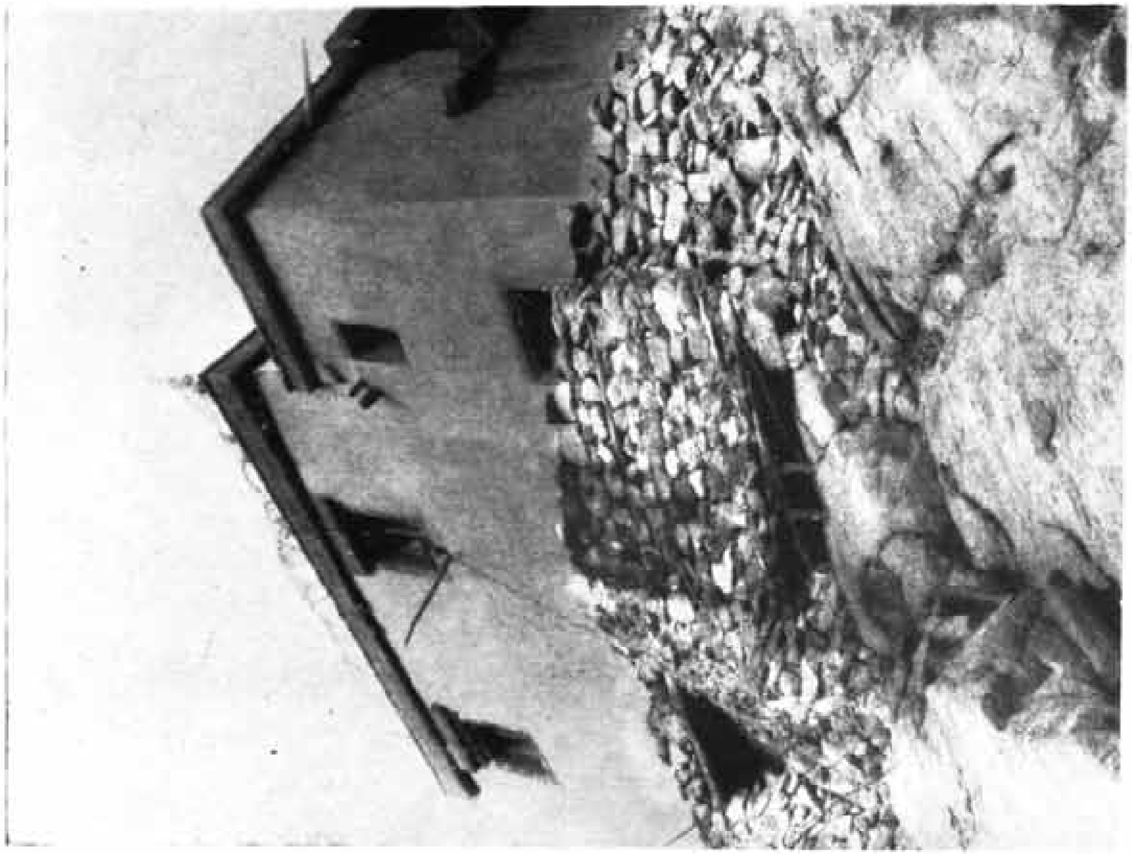


B

Hemis, Buddhist monastery : A, *before and* B, *after conservation.* *See p. 136*



A



B

Phyang. Gong-khang : A, after B, before conservation. See p. 137

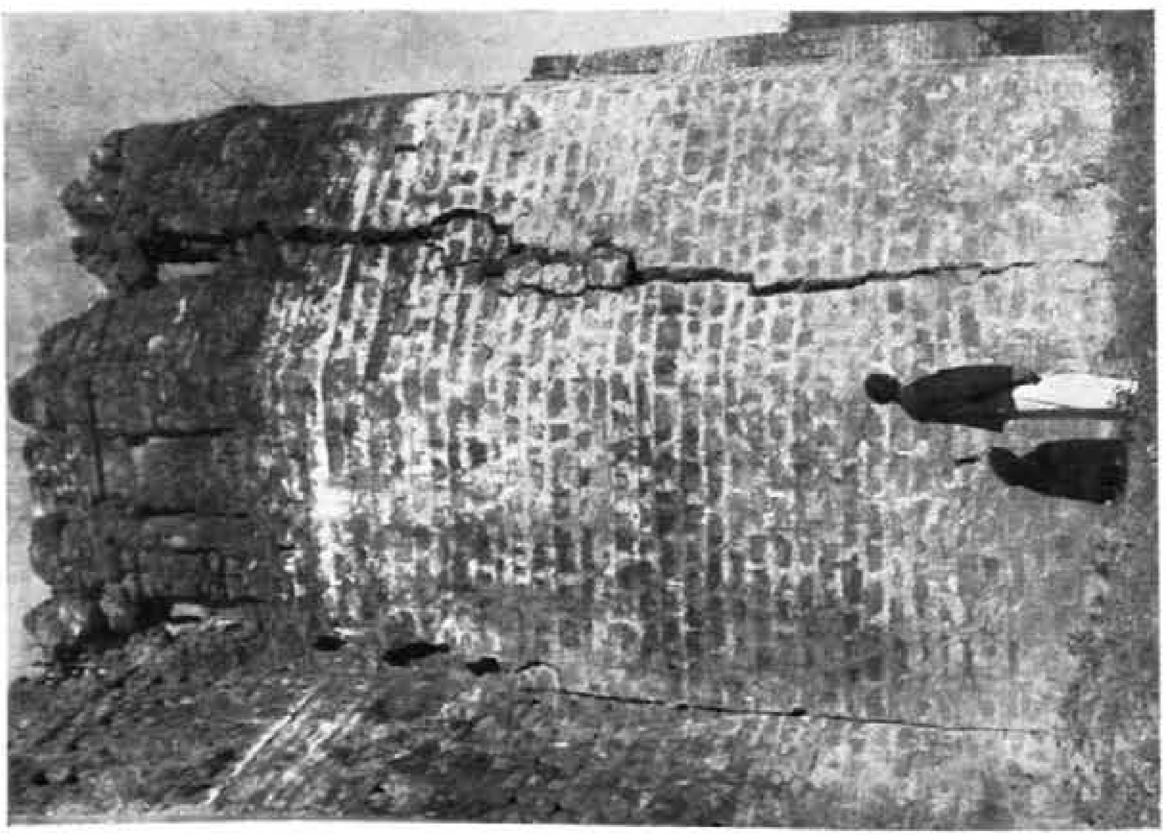


A

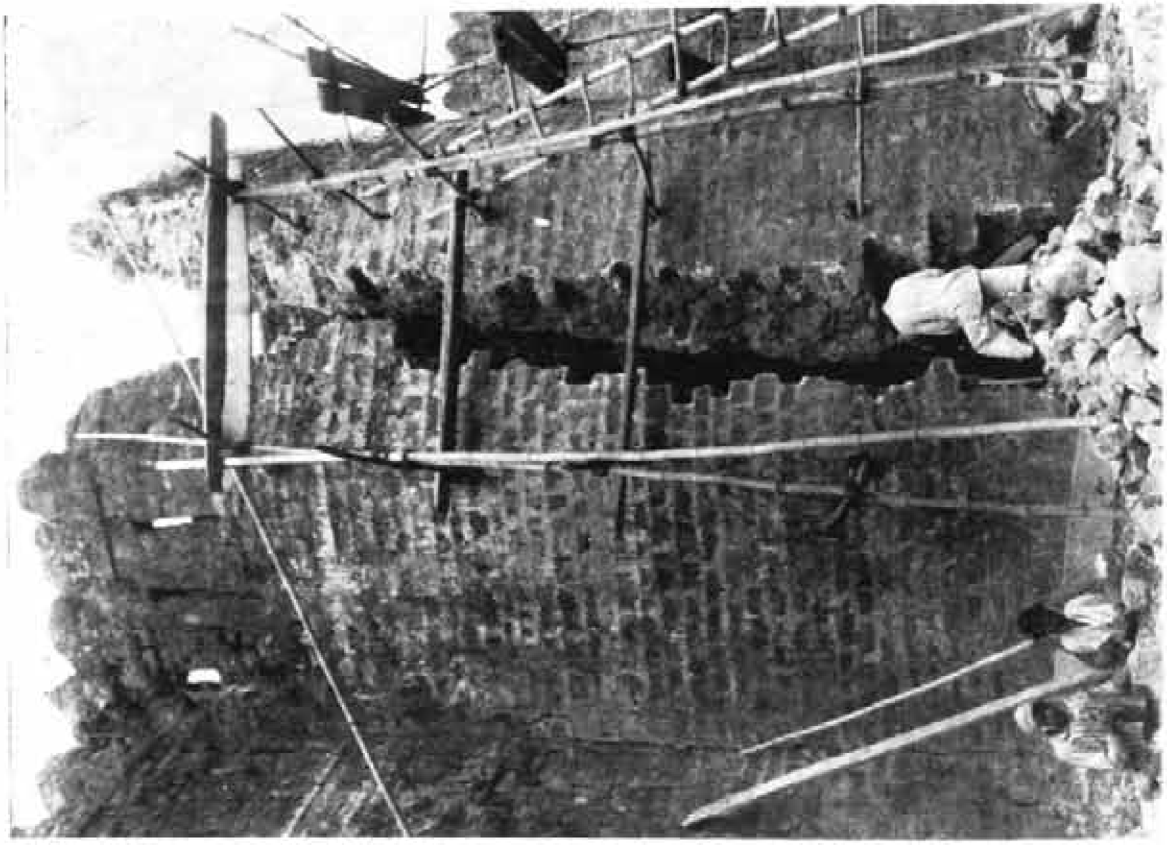


B

Phyang, Gong-khang : A, before B, after conservation. *See p. 137*

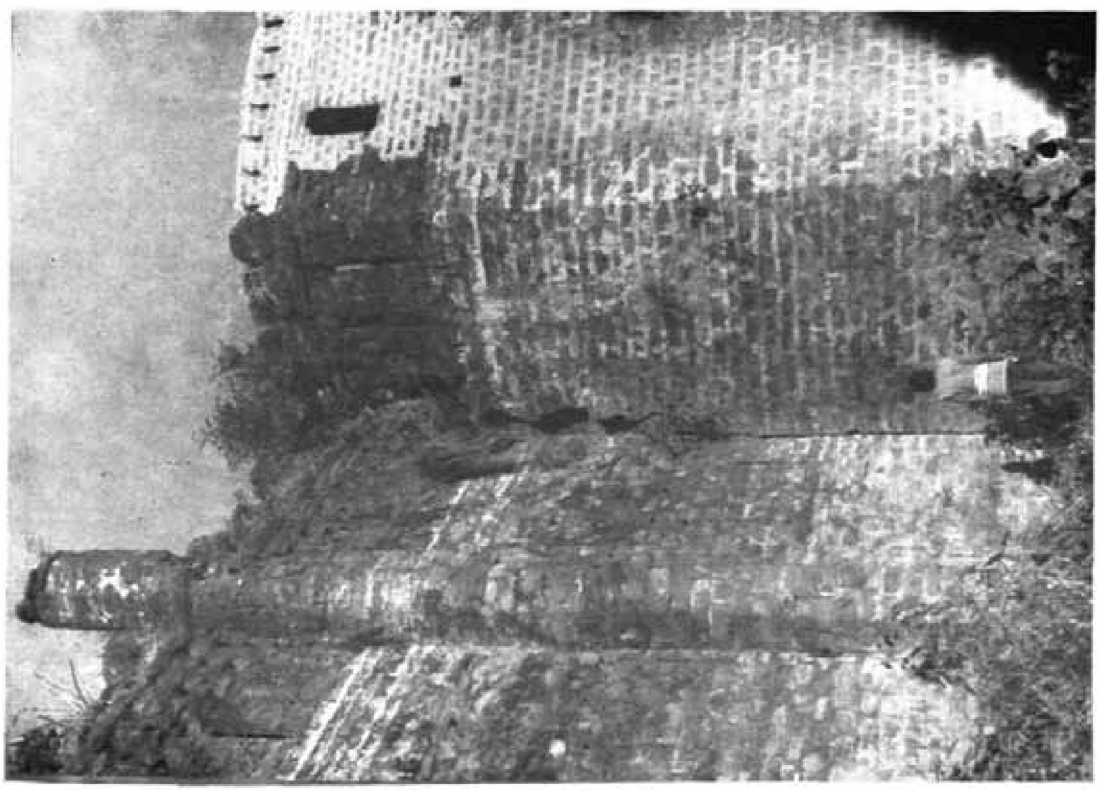


A

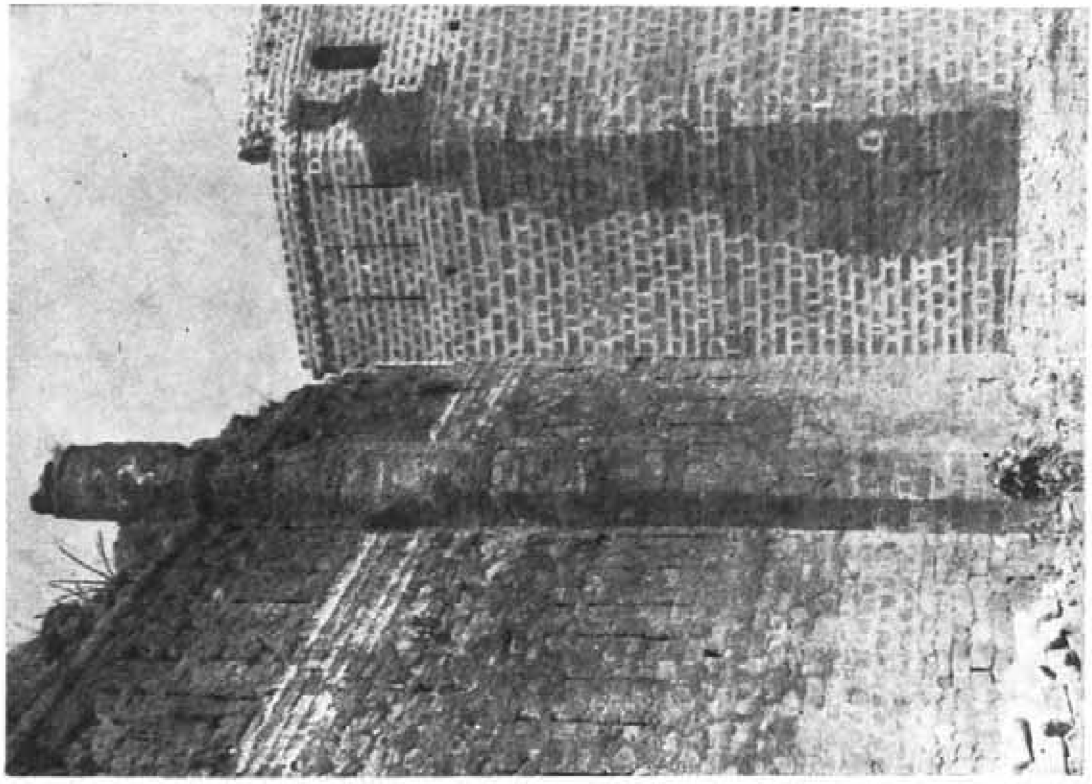


B

Ramnagar, ancient fort : during conservation. *See p. 138*

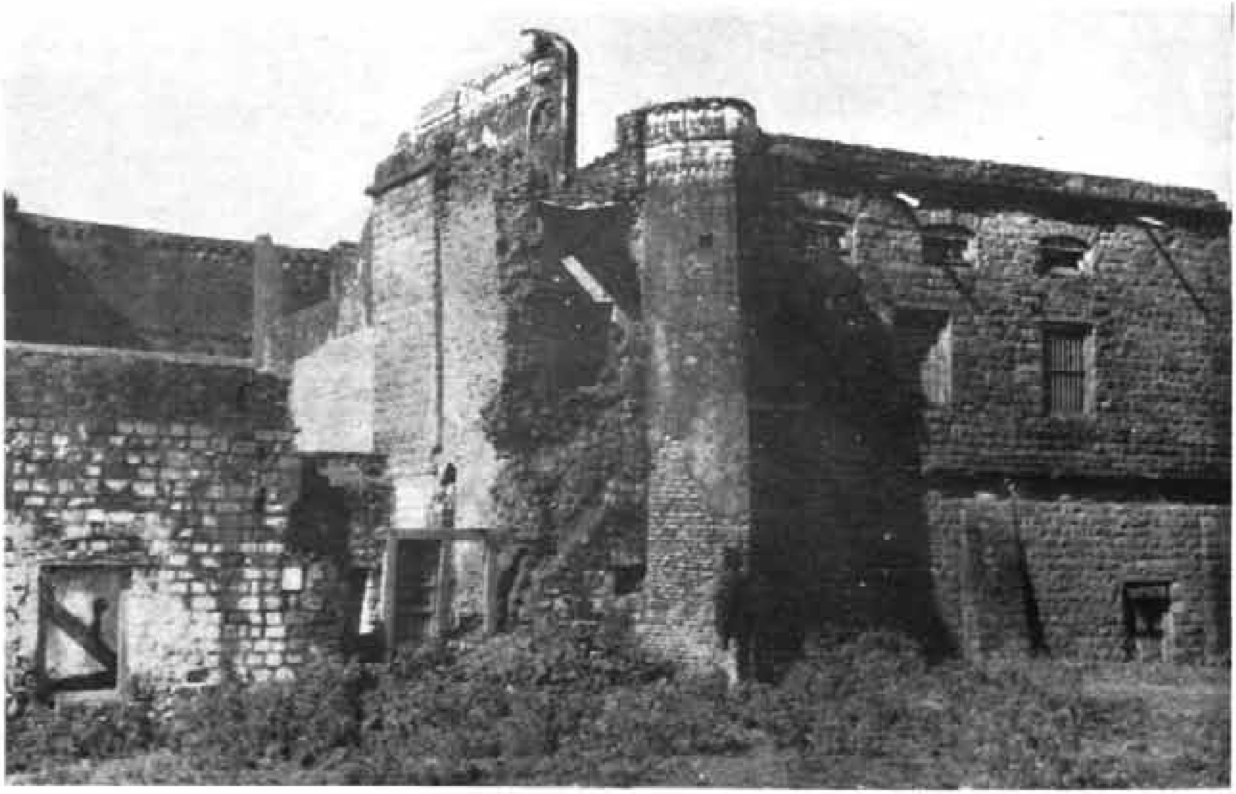


A



B

Ramnagar, ancient fort : A, before and B, after conservation. *See p. 138*



A



B

Ramnagar, Nawa Mahal : A, *before and* B, *after conservation.* *See p. 138*

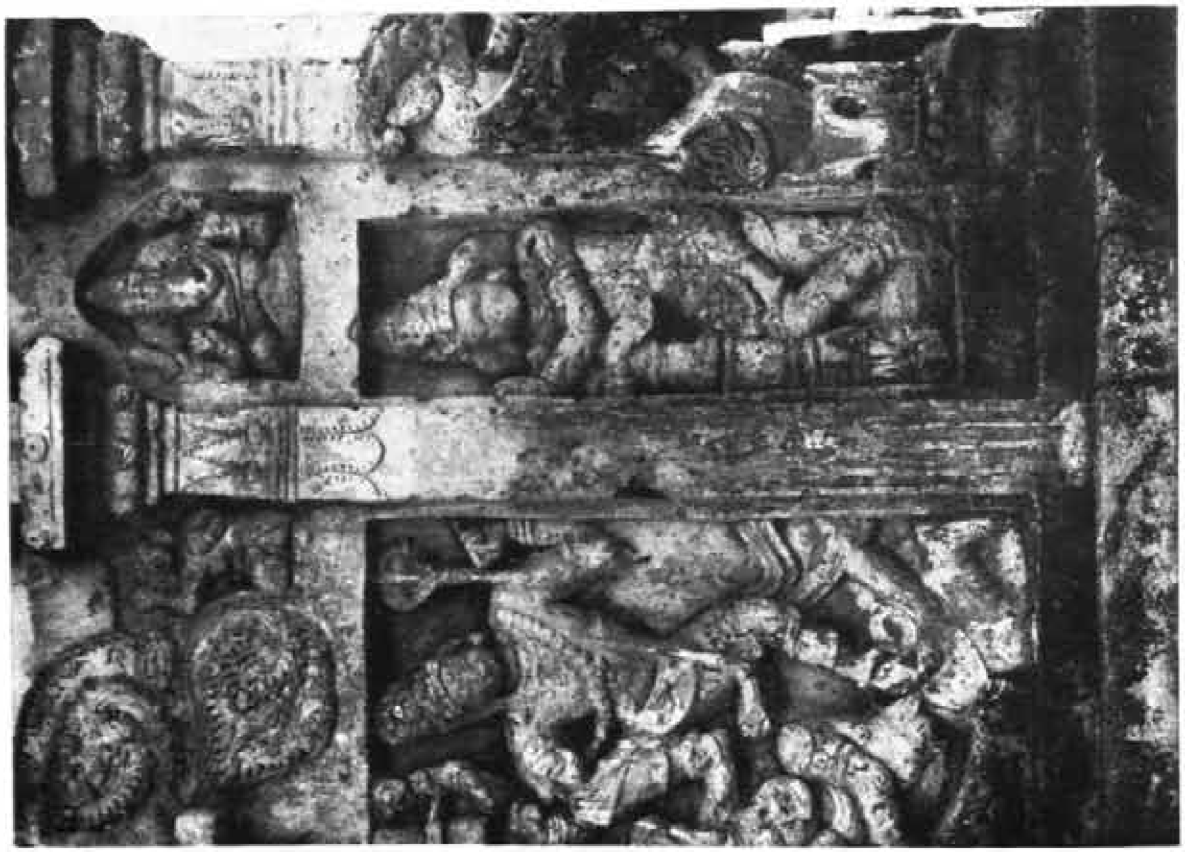


A



B

Palghat, fort : A, before and B, after conservation. See p. 140



B

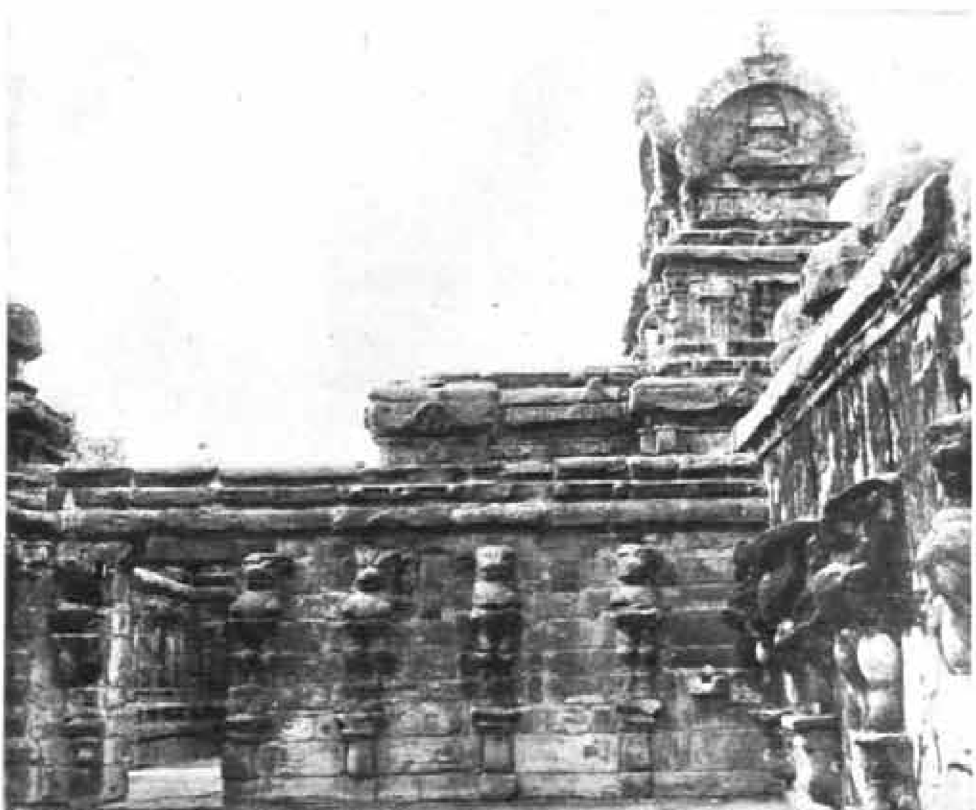


A

Kanchipuram, Iravatanesvara temple : A, *before and* B, *after conservation.* *See p. 140*

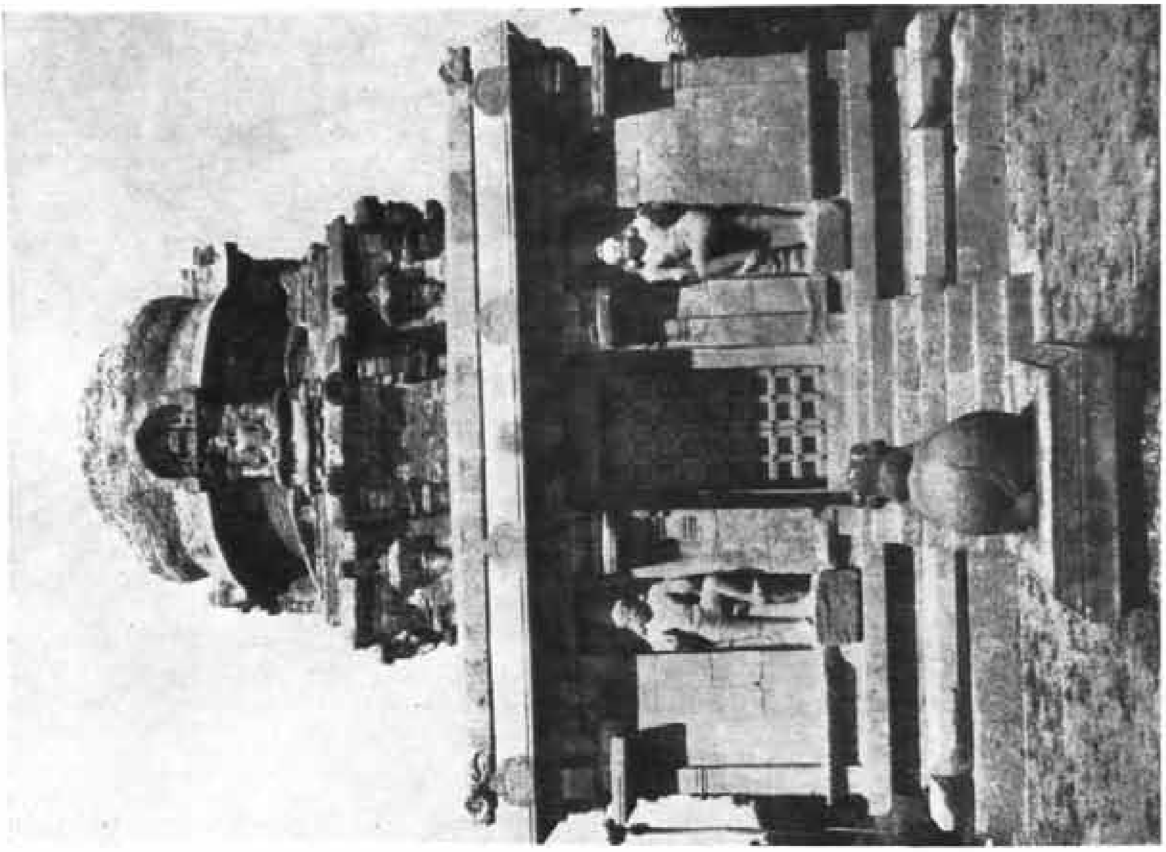


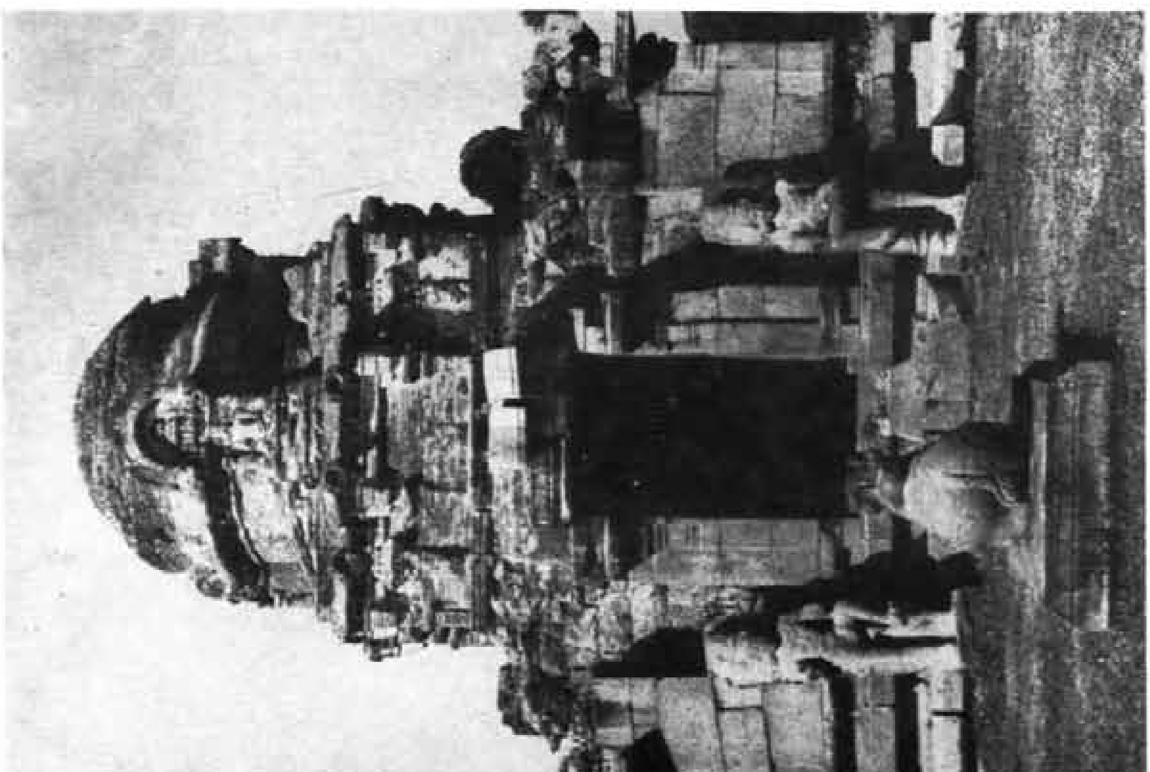
A



B

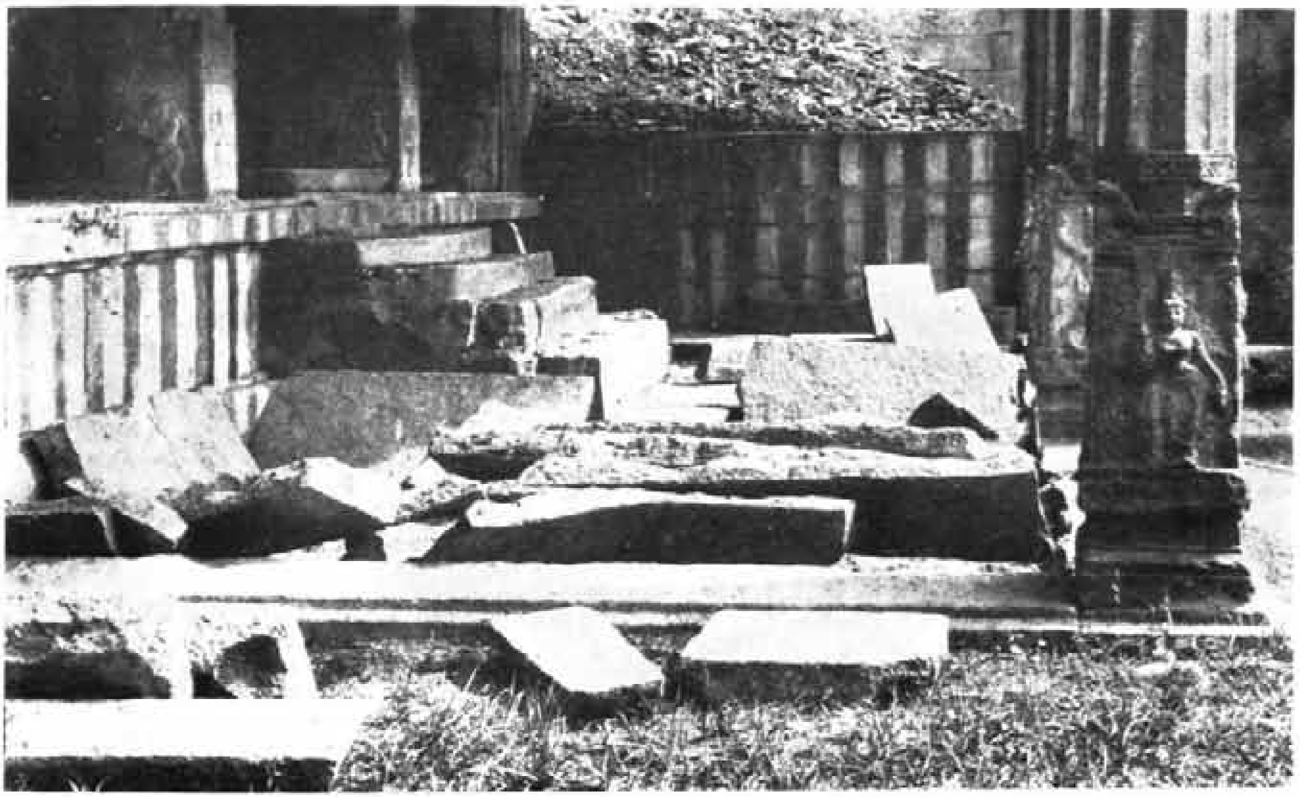
Kanchipuram, Kailasanatha temple : A, *before and* B, *after conservation.* *See p. 140*





A B

Tenneri, Kanthalingesvara temple : A, *before and* B, *after conservation.* *See p. 140*

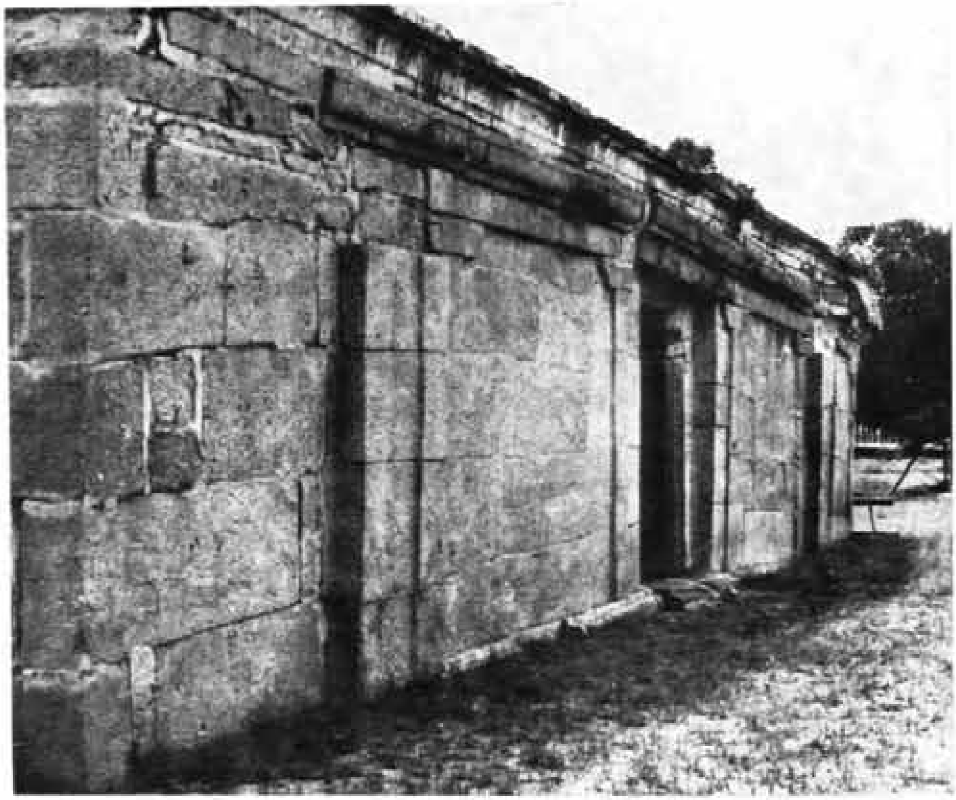


A

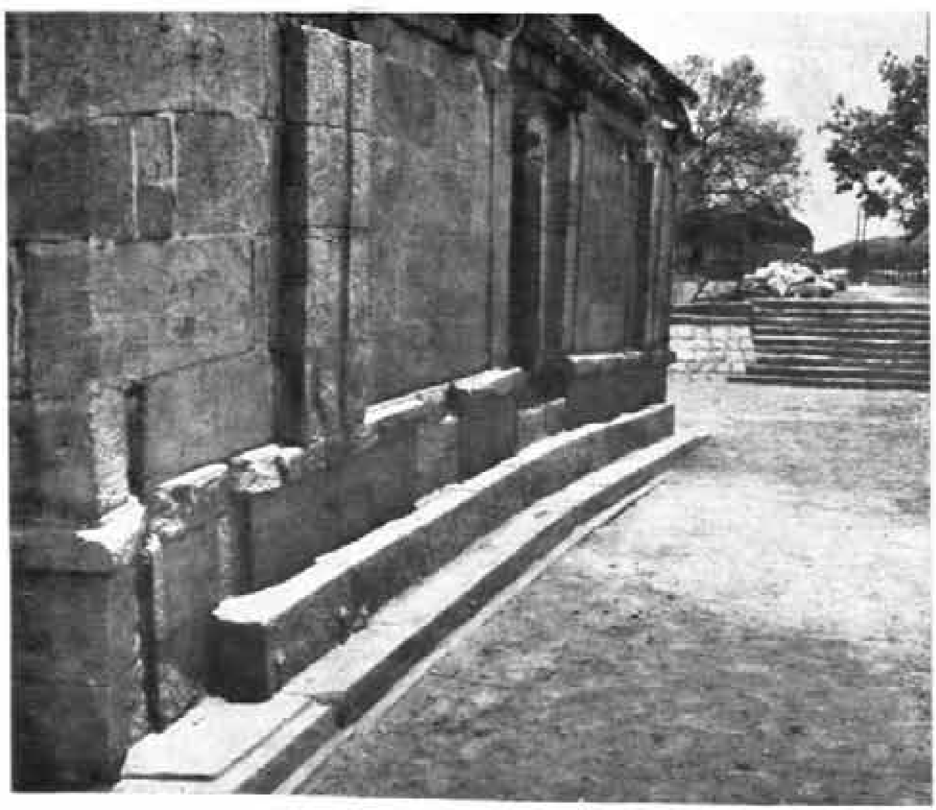


B

Melpadi, Cholesvara temple : A, *before and* B, *after conservation.* *See p. 141*



A



B

Melpadi, Cholesvara temple : A, *before and* B, *after conservation.* *See p. 141*



A

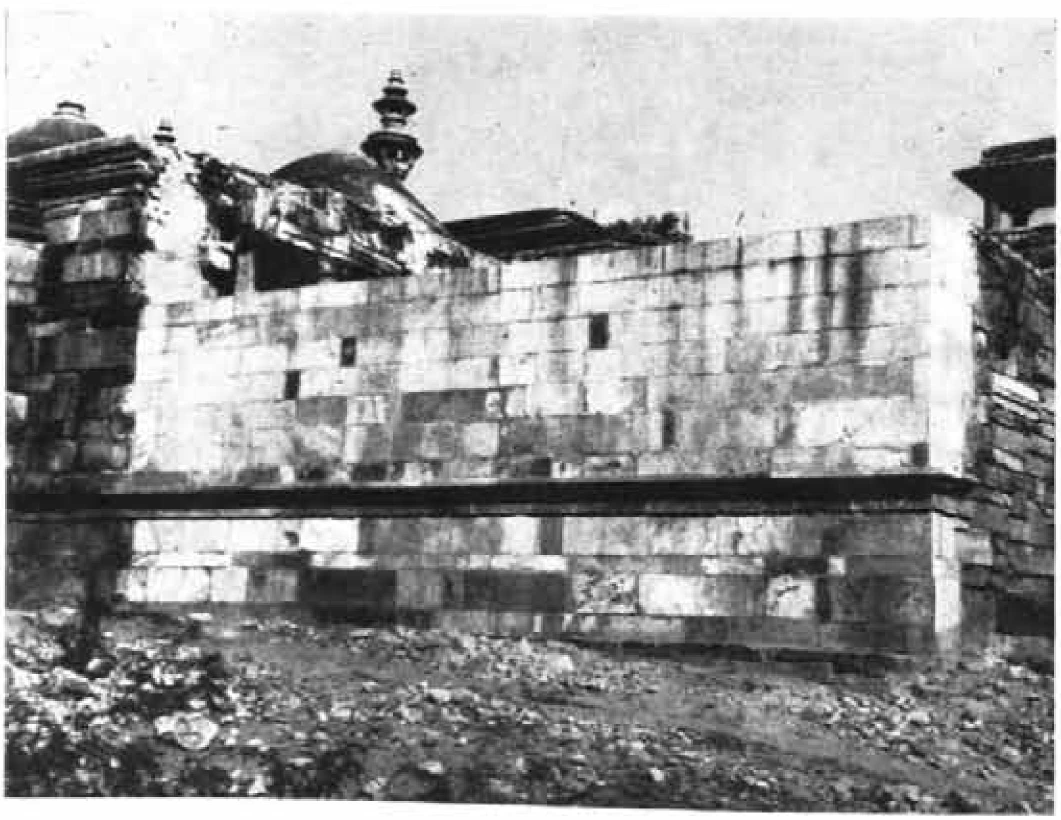


B

Gingee, Venkataraman temple : A, *before and* B, *after conservation*. *See p. 142*

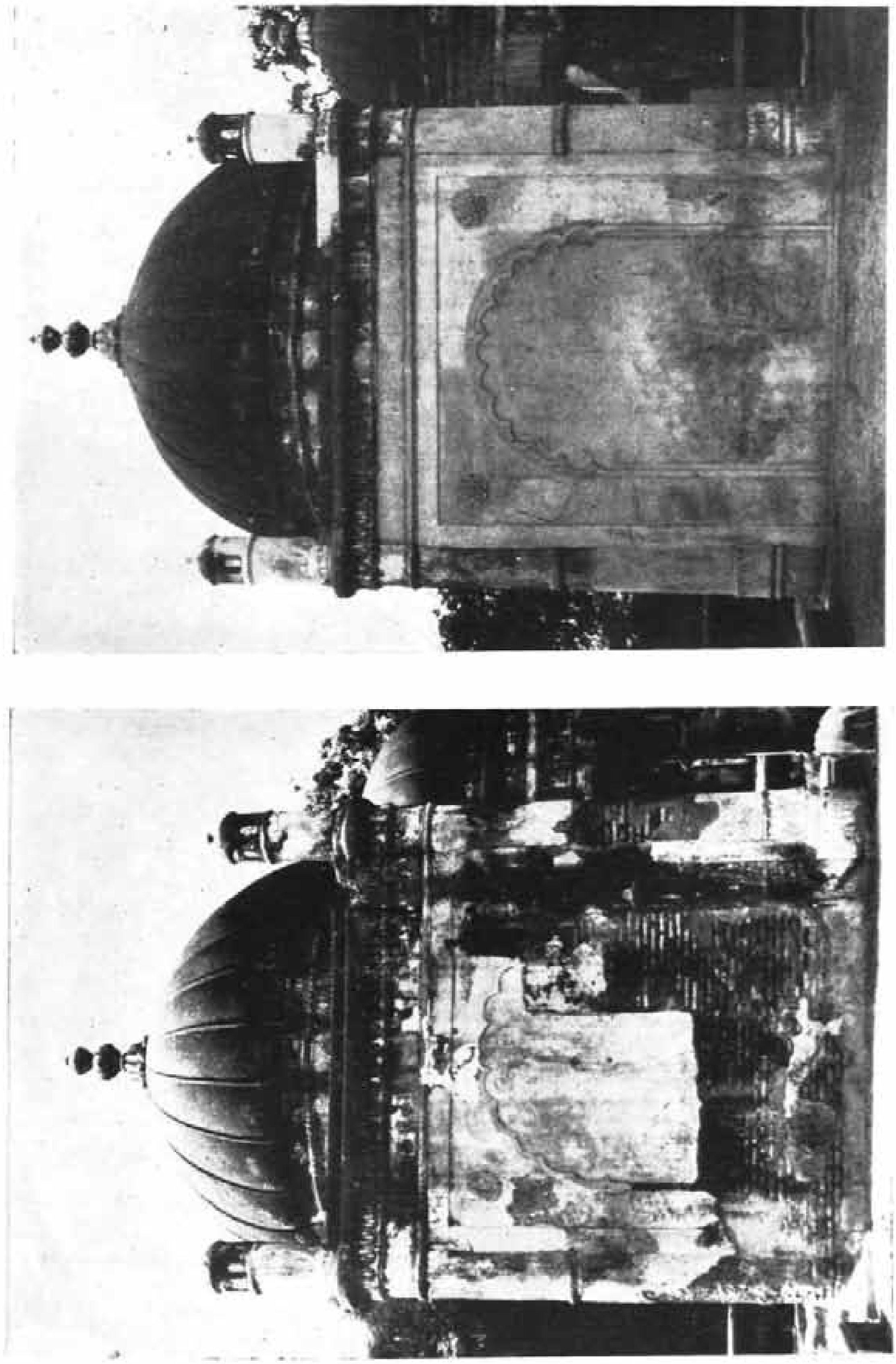


A



B

Dhalka, Balal Khan Ghazi mosque : A, *before* B, *after repairs*. *See p. 144*



A B

Surat, English tomb : A, before and B, after conservation. *See p. 145*



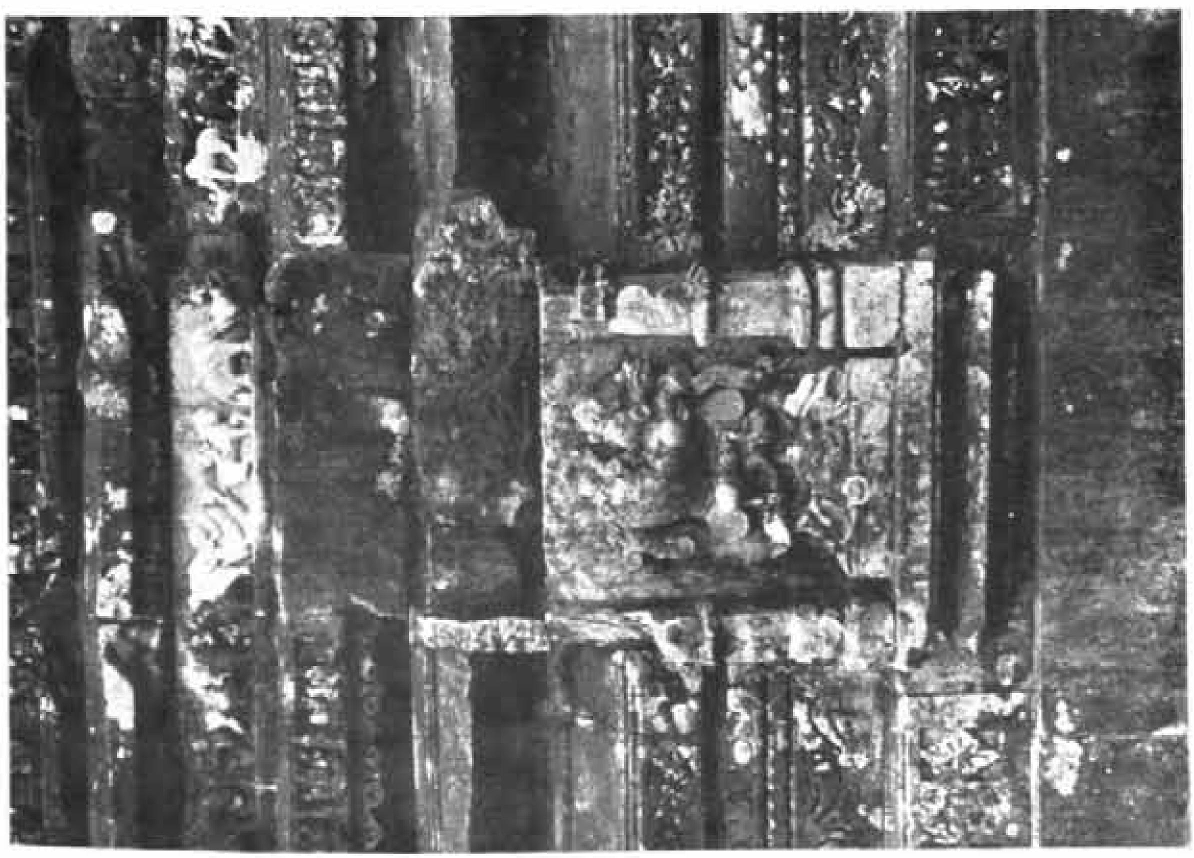
A



B

Arthuna, Nilakantha Mahadeo temple : during conservation. *See p. 145*



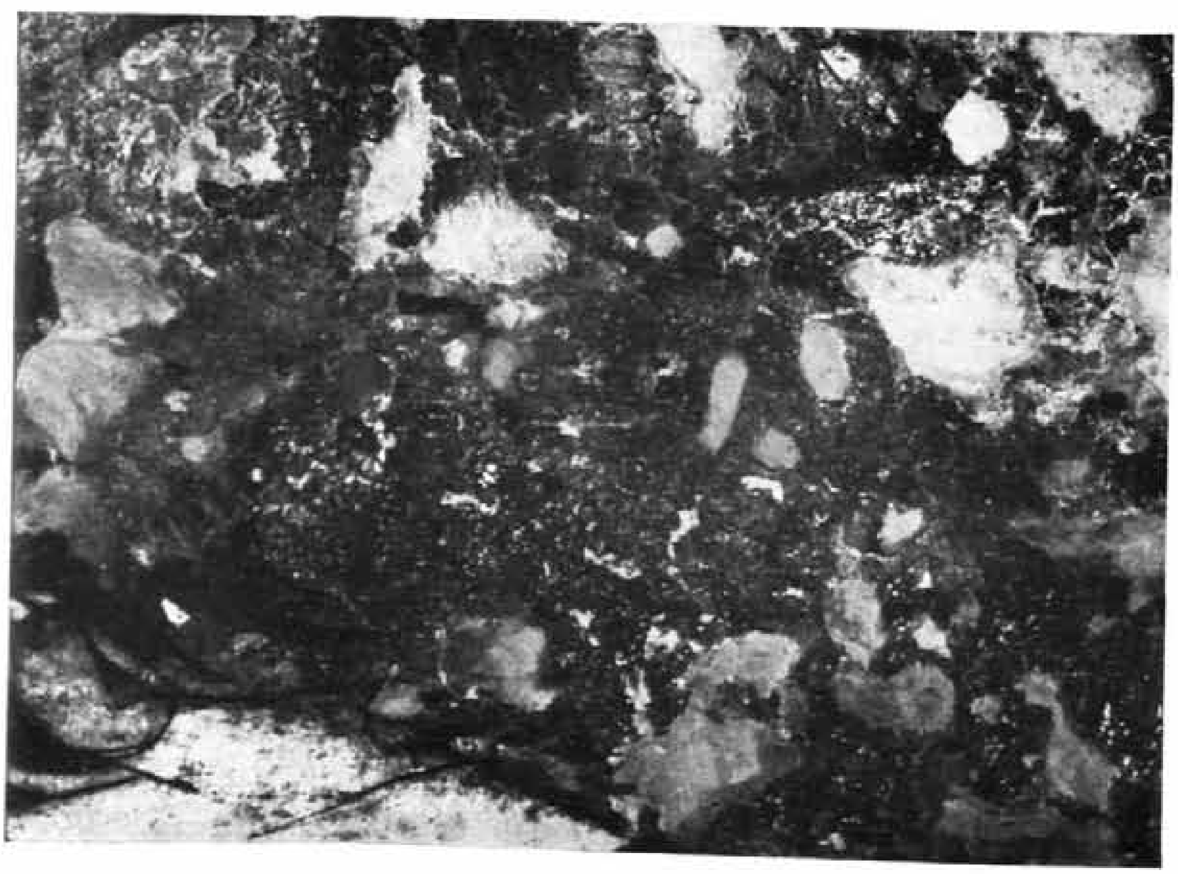


A B

Khajuraho, Duladeo temple : A, before and B, after chemical treatment. *See p. 152*



B



A

Ajanta, cave 6 : A, before and B, after chemical treatment. See p. 152

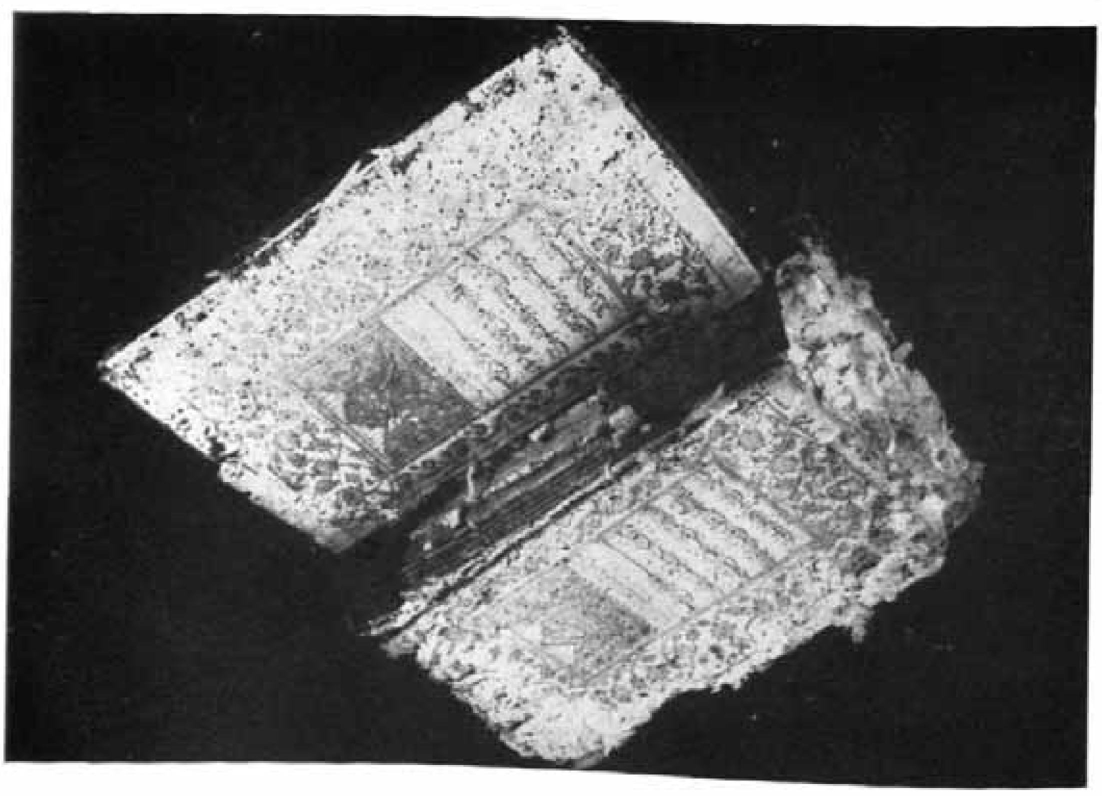


A

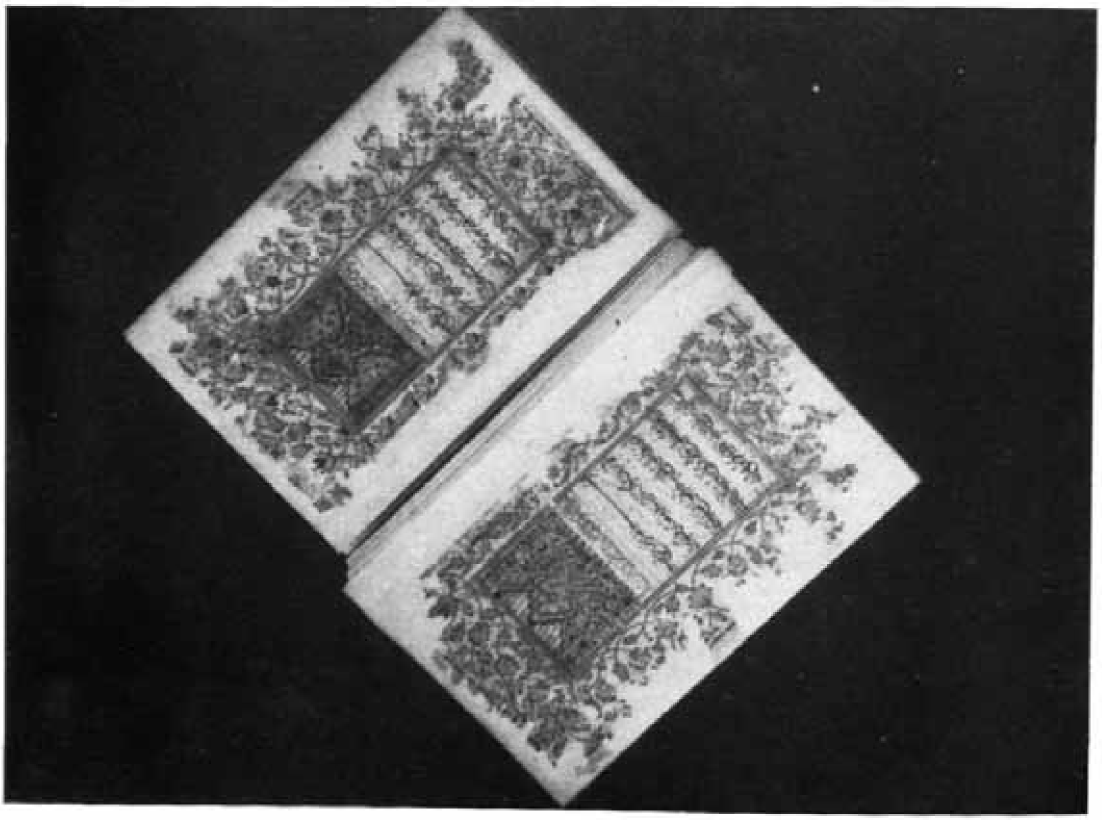


B

Ajanta, cave 6 : A, *before and* B, *after chemical treatment.* *See p. 152*



A



B

Chemical preservation of Quran : A, before and B, after preservation. See p. 156